WESTERN STATES EDITION

DOMESTIC ENGINEERING

Whole No. 816. Chicago and New York, Saturday, August 1, 1908. Vol. XLIV. No. 5. $1 a Year.

KEWANEE PNEUMATIC TANKS

This Trade Mark Proves It

THIS trade mark on a pneumatic tank, proves that it is a Kewanee Pneumatic Tank. Any pneumatic tank which does **not** have this trade mark on it, is positively **not** a Kewanee Tank. We want every dealer to know this, because some people are under the impression that any pneumatic tank is a Kewanee Tank.

There are imitations of Kewanee Pneumatic Tanks and of our complete water supply plants. To protect ourselves from imitators, we put this trade mark on every Kewanee Pneumatic Tank and our name appears on all pumping machinery which we furnish.

In ten or twenty years after the purchase of a Kewanee Pneumatic Tank, it will easily be recognized as a Kewanee Pneumatic Tank; and then, the Kewanee Water Supply Company will stand back of it and may be called upon to correct any deficiency.

The Kewanee System of Water Supply

is not an imitation—is not a substitute. It is the **original** water supply system which involves the use of **air pressure** instead of gravity pressure.

Cheap imitation tanks and outfits almost invariably cause trouble and are very expensive in the long run. Kewanee Pneumatic Tanks and complete Kewanee Systems are guaranteed to give good service. Over 8,000 in successful operation.

Get our catalog and prices. Let us tell you how we can coöperate with our dealers, and how it will be worth your while to push the sale of Kewanee Pneumatic Tanks and complete Kewanee Systems. Mention *Domestic Engineering.*

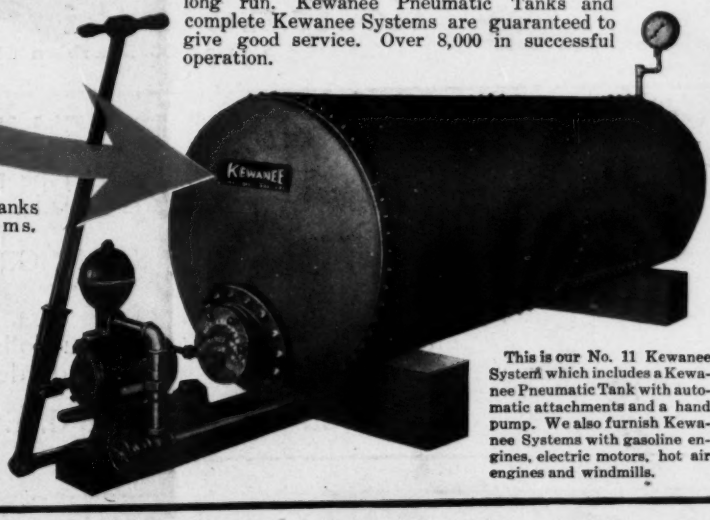
Kewanee Water Supply Company

Kewanee - - - - Illinois

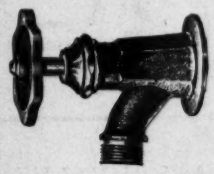
820 Marquette Bldg., Chicago, Ill.

1566 Hudson-Terminal Bldg., 50 Church Street, New York City.

710 Diamond Bank Building, Pittsburg.



This is our No. 11 Kewanee System which includes a Kewanee Pneumatic Tank with automatic attachments and a hand pump. We also furnish Kewanee Systems with gasoline engines, electric motors, hot air engines and windmills.



TWO GLAUBER SILL COCKS FREE

For any Glauber Cock sent you defective

WHEEL HANDLE, LOOSE KEY, CROSS HANDLE, TEE HANDLE
60 STYLES TO SELECT FROM. ***PRICE "RIGHT"***

GLAUBER BRASS MANUFACTURING CO.
CLEVELAND, OHIO

LEAD WOOL

is Shredded Metallic Lead specially prepared as

Caulking Material

Melting pots and jointing tools are not needed. You can make a

Joint under Water

as easy as in a dry place. Write for descriptive circular

Raymond Lead Company
Licensees under Buhne Patent CHICAGO

Crosby Spring Seat Globe and Angle **Valves** All Parts Interchangeable. All Parts Removable. Tested for Highest Pressures. **Leak-Proof** CROSBY STEAM GAGE & VALVE CO. Boston New York Chicago

Entered as Second-Class Matter February 17, 1893, at the Post Office at Chicago, Illinois, under Act of March 3, 1879.

Holland Boilers

Calor Radiators

AND

SPECIALTIES

Made in variety and capacity to meet every heating requirement.

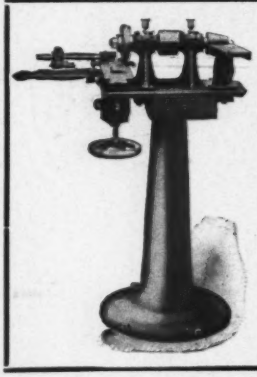
Efficiency and mechanical construction unexcelled.

All shipped at one time from one plant

EASTERN SALES AGENTS:

Camden Heating and Plumbing Supply Company,
416-417 Commonwealth Trust Building,
PHILADELPHIA, PENNA.

Holland Radiator Company,
36 and 38 Dearborn Street, CHICAGO.



DEBUT

It is needless to say that steel pipe requires a sharp, properly shaped die to produce good threads. The little machine shown here is the

B. & K. DIE GRINDER

for the correct grinding of the dies. Simple to operate, moderate in price, and will save you dollars.

Shall we send you description?

BIGNALL & KEELER MFG. CO., Edwardsville, Ill.

MALLEABLE AND WROUGHT PIPE HOOKS AND STRAPS

Complete stock of every size and kind. Quality the best that can be made. B. B. Ornamental Pipe Straps, all even clean cut, brightly tinned. Ask for Catalogue and Prices.

Berger Bros. Co., 231-237 Arch Street, Philadelphia, Pa.

We Manufacture **VALVES** for

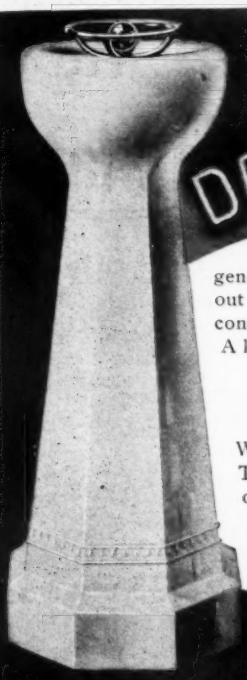
The Principal Railroad Systems, Steamship Lines and Water Works.

Write for Catalog.

ROSS VALVE MFG. CO., Troy, New York.

REGULATING VALVES
STEAM
WATER
FEED WATER FILTERS
FOR
Land and Marine Boilers.

INDEX TO ADVERTISEMENTS ON PAGE XXVI



A NEW LINE OF DRINKING FOUNTAINS

Contagion-spreading drinking cups in schools, factories, public buildings, etc., are being quite generally replaced with fountains which allow the user to drink without touching the lip to anything but the water. There is no danger of contamination with Crane drinking fountains.

A little missionary work along these lines by plumbers will result in some

New and Profitable Business

We will gladly co-operate by furnishing pictures, etc.

The beautiful vitro-ware fixture shown in the illustration will be an ornament to any institution. It "sells itself" when brought to the attention of proper authorities. ¶ We also have multiple fountains for schools, factories, etc.

All Crane sales offices (except Chicago and New York) carry complete stocks of plumbing fixtures and supplies.

CRANE CO.
CHICAGO
ESTABLISHED 1855

GURNEY

HOT WATER HEATERS, STEAM BOILERS, RADIATORS

They give complete satisfaction
Send for latest Catalogues

GURNEY HEATER MFG. CO.,

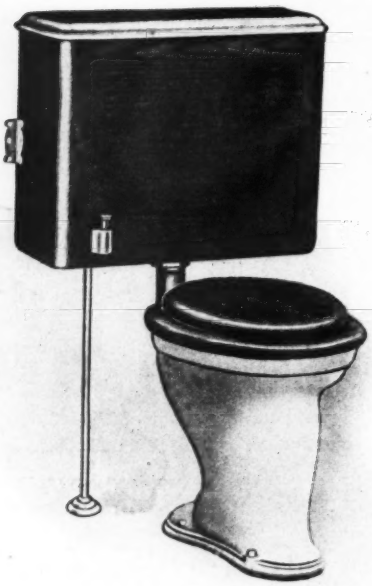
13 East 42nd Street
NEW YORK

188-200 Franklin St., Cor. Pearl
BOSTON, MASS.

Your customer will advertise you

If you sell him a heating plant that is *automatic*. You can make it so by using *the Powers Regulator*. The regulator that is really *automatic*. Doesn't have to be wound up. No batteries. Adds 20 per cent to the capacity of a hot water plant, and saves 25 per cent of the fuel. Write for catalogue.

The Powers Regulator Co., 42 Dearborn St., Chicago



The Davis Line of Closet Combinations

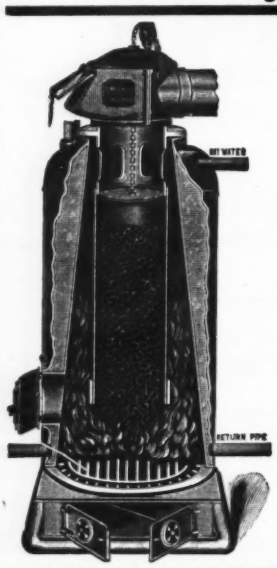
Are built upon the latest approved sanitary principles—Every detail of workmanship is unsurpassed, while the materials, every one, from woodwork to valves and down to the minutest detail are the best to be had.
We take pride in furnishing a complete job and all goods are carefully packed and critically inspected—

SEND FOR OUR 24 PAGE CLOSET BOOK
IT'S FREE

THE JOHN DAVIS COMPANY
Halsted, 22nd and Union Streets
CHICAGO

Cast Fittings—Boilers—Valves—Plumbing Specialties

Conceded by 40 Years' Practical Demonstration



The great superiority of the Wilks' Hot Water Heaters is universally conceded by all **over any cast-iron heaters made.** They have been in practical use since 1869, and are **constructed of best quality of steel,** strongly riveted and calked, with no cast iron cylinders or sections to crack, or bolts or packing to be kept tight or to leak, and no flues or coils to fill up and leak.

Wilks' Hot Water Heaters

STEAM GENERATORS and STEEL TANKS

The grand success achieved by them in past years has demonstrated the fact that for all purposes for which a **safe, simple and economical way of providing hot water and steam** is desired, they are the best in use.
We have added improved machinery, tools, etc., and with increased facilities for manufacturing we have improved the construction of the Heaters and make all sizes, from ten to forty-two inches in diameter; can supply them for all purposes. Have adopted the best forms of grates, connections, etc. They burn hard or soft coal.

MAY WE MAIL YOU OUR CATALOGUE AND PRICES?

S. WILKS MANUFACTURING CO., 3519 Shields Ave., Chicago, Ill.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

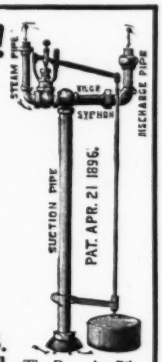
Always on Watch!

THE BRAENDER

CELLAR DRAINER

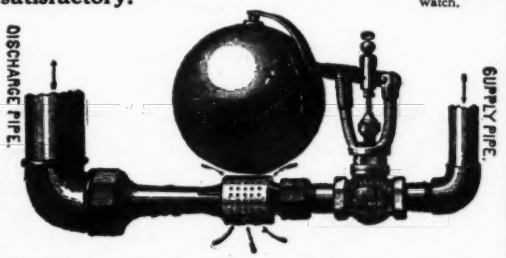
and BILGE SYPHON

Operated by Steam or Water



The Braender Bilge Syphon. Always on watch.

Sanitary experts endorse it. U. S. Government uses it. Guaranteed satisfactory.



Sold to the trade only Write for circular and testimonials

PHILIP BRAENDER, 143 West 125th Street, New York

Sales Agent: W. N. McKenna Company, 75 Chestnut Streat, Boston, Mass.

NOW let's get down to "Burnham" base facts. It's in four pieces, bolted together—when adding a section to your boiler, we furnish a section for the base—no buying of new base—no taking down of boiler--no disconnecting of piping--three economies. So all the "Burnham" economy does not lie in the coal it saves. Send for catalog.

LORD & BURNHAM COMPANY

IRVINGTON, N. Y.

Boston: 819 Tremont Building. Phila.: Keystone Supply & Mfg. Co. Chicago: John Davis Co. Providence: Allen & Reed, Inc. Minneapolis: Roberts Heating & Ventilating Co.

TRADE MARK

TRADE MARK

"Near" Armstrong Stocks and Dies

Should not satisfy you and WON'T

Get the Genuine Armstrong

Don't buy "near" Armstrong Tools! Get the Genuine Armstrong! Their supremacy is indisputable. Armstrong stocks and dies possess a quality all their own—a quality that means "day in day out" efficiency and dependability—a mechanical excellence and utility that can never be successfully imitated.

The trade mark is your safeguard and ours.

See that the Goods you buy bear the trade-mark above

The Armstrong Mfg. Co.

The jaws of this Bard Adjustable Bushing make a perfect center for the pipe, fit snug and insure the cutting of a straight thread. Eliminates the carrying of loose ring bushings—saves time frequently lost in hunting for and changing bushings. A labor saver and time saver worth your attention.

All others are in the make believe class.

Less Armstrong Quality

Your request brings the complete catalog

284 Knowlton Street
Bridgeport, Conn.

"Ohio" Hot Water Radiator Valve

Now for the Fall Trade

THERE IS A FEELING OF SATISFACTION IN HANDLING

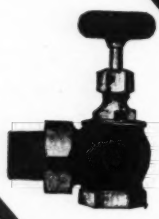
"Ohio" Radiator Valves

which comes of knowing in advance that all "Ohio" Valves will

Satisfy Your Customers

Every piece is accurately made from the best material. It will do its work well—we know because we test each and every one.

IMMEDIATE SHIPMENT



"Ohio" Steam Radiator Valve

WRITE FOR NEW CATALOGUE

"Ohio" Corner Radiator Valve

THE OHIO BRASS COMPANY

MANSFIELD, OHIO

NEW YORK: 43-49 Exchange Place
CHICAGO: 321 Dearborn Street
ST. LOUIS: 10 N. Fourth Street.
San Francisco, Cal.: Wm. P. Horn & Co., 138 Front St.

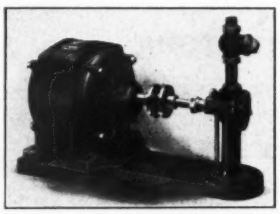
IMPLICITY THE SANITARY SIMPLIFIED

"Sanitary" House Pumps

Everything in Pumps for Domestic Use

DRIVEN BY ANY POWER

ELECTRIC DRIVEN ROTARY PUMP



Not a Centrifugal—It's Automatic

GUARANTEED

"SIMPLICITY SIMPLIFIED"
Simple, Durable, Economical

FOR DIRECT PRESSURE OR OPEN TANK

We have a pump for any kind of domestic service up to 150 pounds pressure, in any capacity for house service. We make it interesting to dealers.

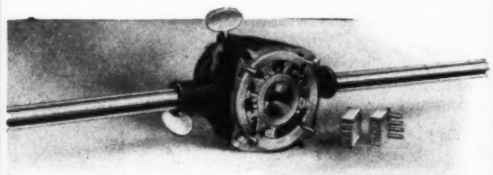
Write today for full particulars

SANITARY PUMP CO.
DAYTON, OHIO

The "Toledo" Pipe Threading Machine Company

(TOLEDO, OHIO)

takes pleasure in announcing to all users of pipe threading tools that it has now perfected a new Threading Device for pipe smaller than one inch.

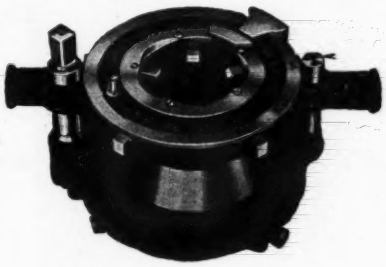


No. 0.
Capacity ⅛ to ¾-inch pipe.

LIST PRICE, - $16 00

It is our desire to tell you more about it. Ask us.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.



Note the simplicity of the Hoefer Adjustable Pipe Threading Machine. This is our No. 30, cutting from 2 1-2 in to 4 in. It is durable, light and extremely easy to operate. Why? It is all in the dies. They are designed with that end in view.

Send for our circulars giving full description.

HOEFER MFG. CO.
FREEPORT, ILLINOIS
Originators not copyists of the one set of dies idea.

A good plumber and a NYE DIE could put a thread around the world.

With a NYE DIE a plumber can cut pipe all day and feel like a mountain daisy. If he uses a NYE DIE in a NYE STOCK he will feel like two daisies.

The Reason is This:

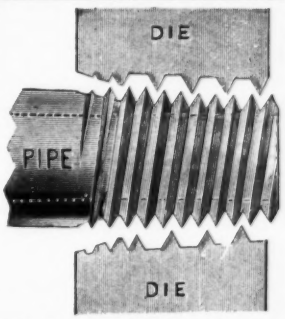
A Nye Die is made of steel as fine as the spring in your watch. There is no friction, and it TAKES JUST HALF THE LABOR TO PULL IT. In an exhaustive test recently made at one of the largest laboratories of applied mechanics in this country, the Nye Die proved to pull 60 per cent easier than any other die tested—and there were a lot of them.

This was clearly due to the construction of the NYE DIE. THAT MEANS THAT YOUR MUSCLES DO LESS THAN HALF THE WORK WITH A NYE DIE than they do with any other make. It means that THE NYE DIE IS THE BEST DIE IN THE WORLD—and it is.

I'll prove it to you too! Pay no attention to my claims for the superior qualities of my products. Just get them on TEN DAYS TRIAL and let them do their own work. That's fair, isn't it, fellows?

You can't fool the man behind the stock. He knows how the Die cuts.

"NYE" the Die Man



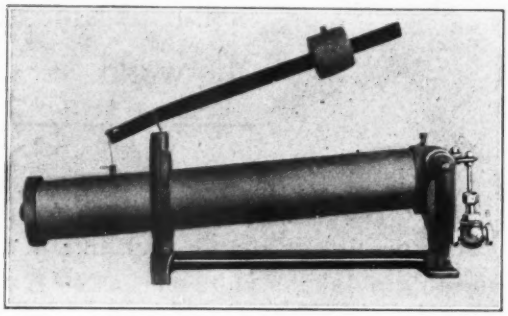
THE NYE TOOL AND MACHINE WORKS
19-21 SOUTH JEFFERSON STREET, CHICAGO

SIMPLE AND POSITIVE

"THE RYAN SCHEME"

RETURN STEAM TRAP

IS THE BEST BUILT YET



BETTER KNOW IT NOW

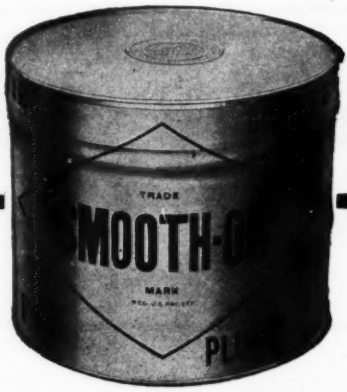
WRITE FOR INFORMATION
'TWILL BE WORTH WHILE

MANUFACTURED AND SOLD BY

E. J. RYAN

117 NORTH WALNUT STREET, DANVILLE, ILL.

? ?



Do You Know It?

Look for the

RED LABEL

Our 100-page book shows you how to make a lead joint without caulking lead. It is free—Send postal for it Today.

SMOOTH-ON MFG. CO.

JERSEY CITY, N. J.

CHICAGO WAREHOUSE
61-69 N. JEFFERSON ST.

SAN FRANCISCO WAREHOUSE
94 MARKET ST.

CAREFULLY FINISHED

FLOOR and CEILING PLATES

One of our eight patterns

THIS IS OUR NO. 7 STYLE

They are the old tried and true plates made by us for years. Sizes range from ¼ to 10-inch. They are all

Coppered before Nickeling

We have made a reputation tor making the best floor and ceiling plates. We will not lose that!

WRITE FOR CATALOG AND PRICES

The Beaton & Corbin Mfg. Co.

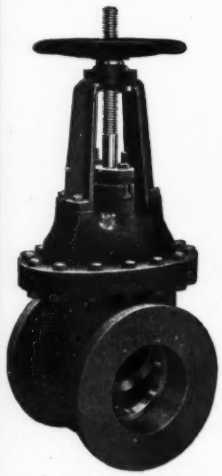
Southington, Conn., U. S. A.

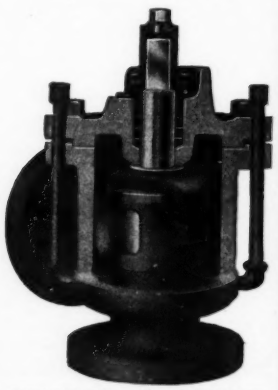
THE "NEW ELLIPTIC" MEDIUM PRESSURE GATE VALVE

500 LBS. TEST GUARANTEED

THE ROTHCHILD "INVERTED" BLOW-OFF COCK

NEVER LEAKS—NEVER STICKS





WRITE FOR PAMPHLET

FREE TRIAL FOR 90 DAYS TO RESPONSIBLE PARTIES!

JOHN SIMMONS CO. 102-110 CENTRE ST. NEW YORK

EVERYTHING FOR THE STEAM, GAS, WATER AND SANITARY ENGINEER

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

Trimo Monkey Wrench

ALL FORGED STEEL CASE HARDENED

Send for Catalog No. 42

A NEW DEPARTURE

The movable jaw extends outward instead of toward the handle, therefore

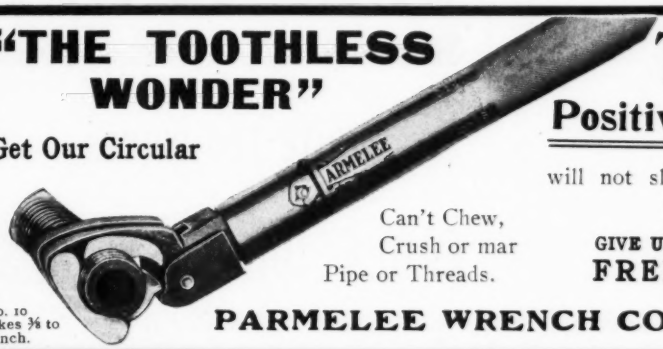
the larger the Nut the longer the leverage

Threads in Both Nut and Jaws are Rounded, thus Preventing Stripping

TRIMONT MFG. CO., 55 to 71 Amory Street, ROXBURY, MASS.

"THE TOOTHLESS WONDER"

Get Our Circular



The Parmelee Positive Grip Pipe Wrench

will not slip on oily galvanized or polished pipe. No lost motion.

Can't Chew, Crush or mar Pipe or Threads.

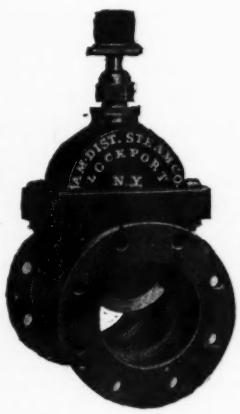
GIVE US NAME OF YOUR JOBBER FOR

FREE 10 DAYS TRIAL

No. 10 takes ⅜ to 1 inch.

PARMELEE WRENCH CO., CHICAGO, ILL.

Packingless Iron Body Gate Valves



These valves are completely bronze mounted, whereas, ordinarily, gate valves of the general pattern are but partially bronze mounted.

The valve stems of the standard valve are ground, having ground collars, and are packingless, due to the seating on these collars. They are machine finished, solid bronze type. The third seat on the stem prevents leakage around the stem, in either the full open or full shut position. A small amount of packing only is used around the stem to prevent any leakage while the valve is being opened or closed.

The bronze valve seats of the standard valve are screwed into place and then machined. The ordinary construction is to drive the valve seats into place in the body casting and then machine same. The body casting of the standard valve is very substantial, and is made of a fine quality of close-grained iron. The gland nut on the standard valve is bronze; the ordinary construction is to make these gland nuts of cast iron. The valve bonnets of the standard valve are internally brass mounted, which is a construction not ordinarily followed by other manufacturers.

One distinctive feature of this valve is the area of the opening through the valve; it is absolutely the full size of the valve without projections reducing the cross section.

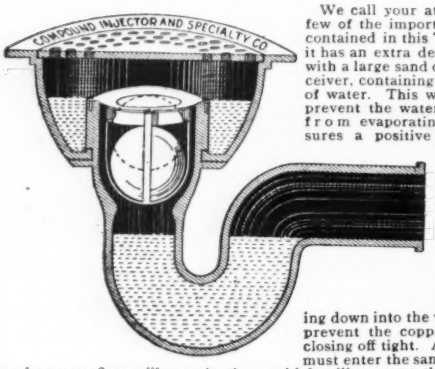
Write for catalogue and prices on High Grade Steam Specialties

AMERICAN DISTRICT STEAM COMPANY

MAIN OFFICE: LOCKPORT, N. Y.

Western Office: Monadnock Bldg., Chicago Factories: Lockport and N. Tonawanda, N. Y.

A Positive Automatic Back Water Trap



We call your attention to a few of the important features contained in this Trap. First, it has an extra deep seal trap, with a large sand cup in the receiver, containing a large body of water. This will positively prevent the water in the trap from evaporating, which insures a positive seal at all times. Second, the cover on the receiver has a solid center which prevents string, lint and other material from hanging down into the valve seat to prevent the copper ball from closing off tight. All the solids must enter the sand cup and if too heavy to float will remain there, which will prevent the trap from choking up. The complete fixture is manufactured of all high grade extra heavy material. The receiver being adjustable makes it very convenient to caulk the trap in place. After the trap is caulked in place, set the receiver on the trap, turn slightly when it will lock itself. (No screws or bolts to strip or break off.) The 2-in. weighs 17 lbs., the 4-in. weighs 38 lbs.

If you have been disappointed in the past with the so-called Back Water Traps, it will be to your interest to purchase at least one of these fixtures for your inspection. We are willing for you to be the judge. Our prices are very reasonable for a high grade article.

Write to your nearest jobber or send to us for a complete Catalogue of a full line of sanitary specialties.

Compound Injector & Specialty Co.

1195 W. Irving Park Blvd. Chicago, Ill

We Certainly Do Make Good

GROUND KEY

Stop and Stop & Waste Cocks

WRITE FOR PRICES

EAGLE BRASS WORKS

Detroit, Michigan

Ninety-Nine Reasons

would be useless when nine would convince anyone of the superiority of

THE CRAWFORD

WATER BOILER

we would like to let you know, beyond all manner of doubt, just what

GOOD POINTS

our entire line of boilers have. We make boilers for all conditions and places and we

MAKE THEM RIGHT!

WRITE FOR CATALOGUE

Walker & Pratt Mfg. Co.

31-35 Union St., BOSTON, MASS.

COMBINATION Electric Weld GAS WATER HEATER

You'll always find listeners when you talk Electric-Weld Gas Water Heater. It's the solution of the hot water difficulty—the end of half hearted service.

It heats up more water in less time than any other heater. Burns less gas but concentrates the heat on the water.

Enthusiastic users all over the country are spreading news of the Electric-Weld—making it the liveliest plumbing topic since gas came into common use as a kitchen fuel.

People everywhere are running to their plumbers for facts and figures — and are coming back with orders.

Architects are specifying the Electric-Weld wherever a gallon of water is needed—intermittent household demand or the drain from a hundred faucets.

Prices from $15.00, list. We distribute only through the trade.

Your jobber handles this line. See him about it.

Send for our booklet, "Hot Water in the House." It'll give you interesting facts.

JOHN WOOD MFG. CO.

CONSHOHOCKEN, PA.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

National No. 1

National No. 2

National No. 5

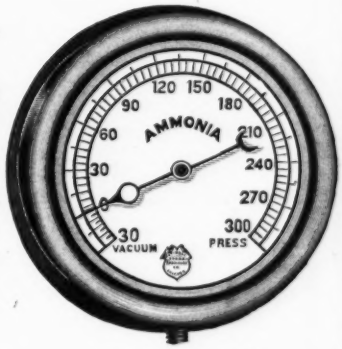
National No. 6

National No. 4

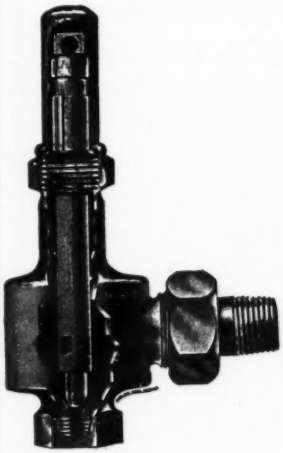
National Altitude Gauge

JUST A FEW RANDOM PICKINGS FROM OUR CATALOGUE

SEND FOR IT



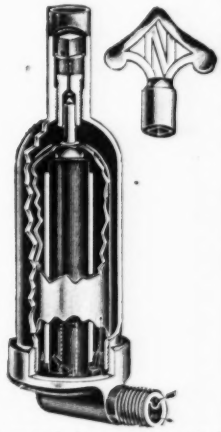
National Ammonia Gauge



National Thermostatic Trap

National No. 9 Drain Valve

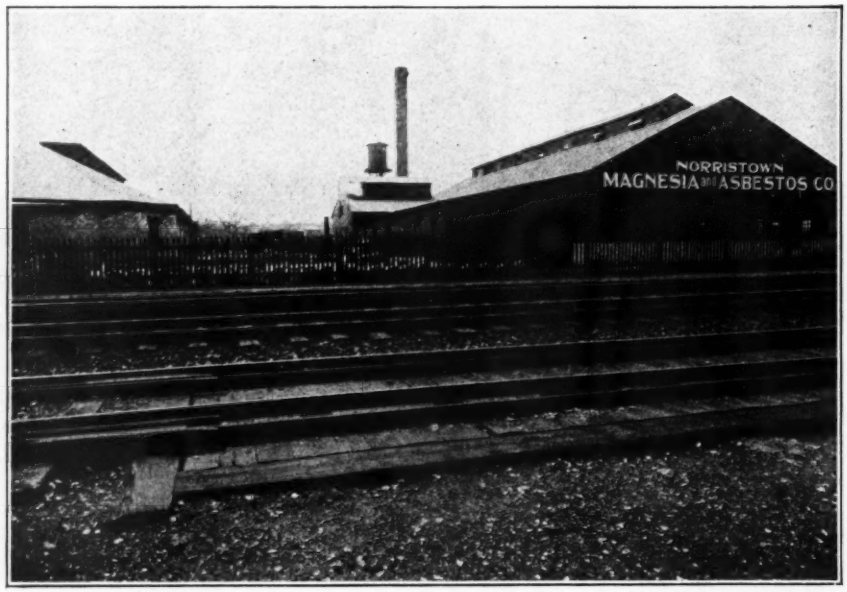
National No. 9 Vacuum Valve



National No. 5 Lock Shield Valve

NATIONAL STEAM SPECIALTY COMPANY

230 EAST WASHINGTON STREET, CHICAGO, ILL.



Take Notice

THE above cut represents our new factory which is well equipped for making Asbestos Papers, Mill-boards, Corrugated Asbestos Paper and Air Cell Coverings.

We have all facilities for filling large and small orders promptly, and we hope you will write us for prices and one of our new catalogs of "Diamond N" products.

Norristown Magnesia & Asbestos Company

Selling Agents in all Large Cities

Executive Offices: Norristown, Pa.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

THE OLD RELIABLE

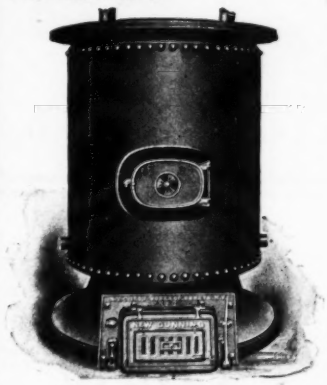
DUNNING BOILERS

FOR ALL PURPOSES

Water Club Dunning.

They're Good Enough for "Uncle Sam," Good Enough for You.

The United States Government is very particular in their specifications when purchasing boilers for their own use. Dunning Boilers meet the requirements. Dunning Boilers are used quite generally by the U. S. Army and Navy Departments.

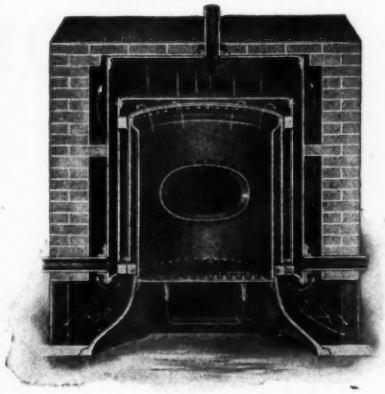

Vertical Circulation Brick Set Water Dunning.

THE REGULAR DUNNING IS MADE IN FOUR STYLES:

PORTABLE STEAM — PORTABLE WATER
BRICK SET STEAM — BRICK SET WATER

THE CLUB DUNNING SERIES CONSISTS OF TWO STYLES:

PORTABLE STEAM and PORTABLE WATER


New Dunning Brick Set Steam

The DUNNING BOILER

is built at the factory by expert mechanics, not at the place of installation by those unskilled in boiler construction.

The few parts reduce repairs to a minimum.

There absolutely is not another heating boiler made that has so few repairs.

ASK US FOR TESTIMONIALS AND NEW CATALOGUE

New York Central Iron Works Co.

GENEVA, N. Y.

THAT THERE IS

NO TURNING BACK

TO BE DONE WITH THE

"Buckeye" Die Stock

MEANS—

That the dies open (and automatically) when the threads are finished.

That there is no leader screw to run back on before another thread can be cut.

That without a leader screw, the user is relieved of many troubles.

That a thread is not going to be spoiled after it is cut.

These facts pertain to a tool that has the **Narrow, Easiest-Cutting Style of Dies**

No. 23, a one-man tool for 1 to 2 inches with a single set of dies.

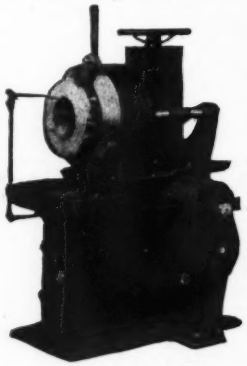
THE HART MFG. CO., 1350 E. Third St., Cleveland, O.

We don't claim to make the

Only Good Pipe Machine

what we claim is to make the

Most Improved and Best



Motor-Driven

THE LOEW VICTOR MODEL 1908

Gas Engine Driven (Self-contained)

¶ Not one pound more in weight than is necessary, but all that is necessary to make it the best constructed and most subtantial machine on the market today.

¶ The Loew Victor has all the advantages of the lathe-bed types, with none of their disadvantages. ¶(Also belt-driven type.)

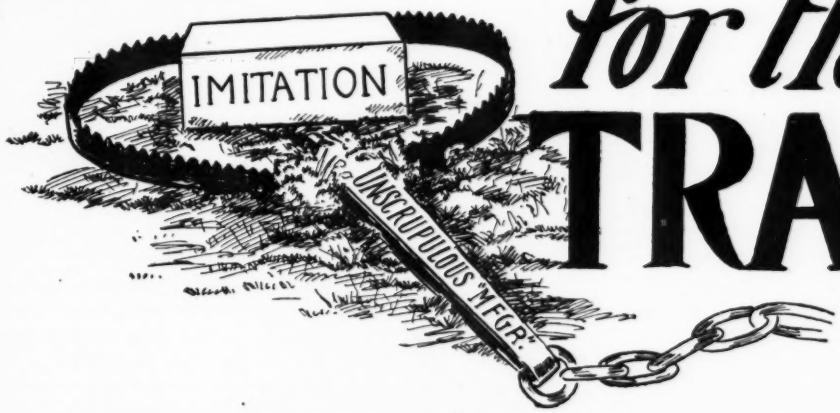
The Loew Manufacturing Co., Cleveland, Ohio

Eastern Representative:
N. G. ROST, 39 Cortlandt Street
New York City

Pacific Coast Representative:
W. S. DEPIERRES, 27 Pine Street
San Francisco

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

LOOK OUT for the TRAP!



DO NOT BE CAUGHT BY THIS BAIT!

Unscrupulous manufacturers are placing upon the market alleged "just as good" Heat Generators, but the very fact that they say "just as good" proves that they are rank imitators of the system that has built up a national reputation as the greatest and most successful, economical and efficient heating system ever devised. GET THE GENUINE IT COSTS NO MORE, it's

The HONEYWELL HEATING SYSTEM

(Over 6,000 installed last year—not one complaint.)

It will save 10 per cent in cost of material, 25 per cent saving in labor and 20 per cent in fuel consumption. ¶ This combination of reductions in cost of installation and operating expenses, puts the advantages and comfort of the mild temperature HOT WATER HEAT within the same means as steam.

IT WILL NOT COST YOU ONE PENNY to prove the truth of our statements, we invite the skeptical fitters to test our claims at our expense—

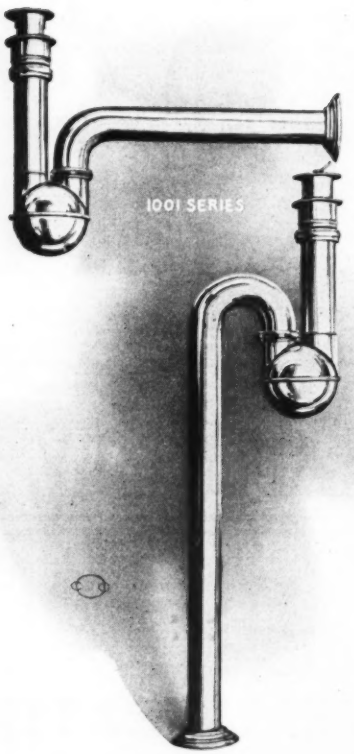
Write us today for full particulars of our guarantee which goes with every Honeywell Heat Generator we sell. IT WILL MEAN MANY EXTRA DOLLARS FOR YOU.

Honeywell Heating Specialty Company

WABASH, INDIANA

Another New One

The "Femco" Deep Seal Anti-Syphon Trap



Patent Allowed.

The "FEMCO"

Unquestionably the best competition trap ever made.

LET US SEND FULL PARTICULARS

The Frost Mfg. Co., Kenosha, Wis.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

"PEERLESS"

The Valve of Quality

PEERLESS Steam and Hot Water Valves are the Valves You Want

Fully Guaranteed. Carefully Inspected and tested

Brass Gate Valves—Closet Tank Trimmings

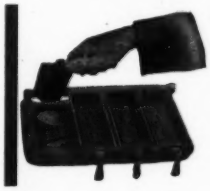
Ask for prices and Catalogue

Peerless Heater & Valve Co., Flint, Mich.

Manufacturers of "Valves of Quality"

"PEERLESS"

The Valve of Quality



HAVE YOUR NAME ON

Our little Machine Mould will put your name and address on all your 5-lb. Solder or Lead Bars

It Is Good Advertising for You

CIRCULARS FREE FOR ASKING

EUREKA MOULD CO., MEDFORD, MASS.

WILL NOT COST MUCH

Ever Use This

For joints of gas, water, steam or air piping nothing equals Dixon's Pipe-Joint Compound. It makes tight joints but never sets.

Joseph Dixon Crucible Co., Jersey City, N. J.

Sample Can Free

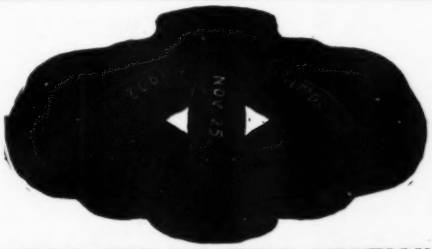
If you want to test Dixon's Pipe-Joint Compound for yourself, write to us for free sample can No. 37-D—You'll like it.

Joseph Dixon Crucible Co., Jersey City, N. J.

PRICES ARE RIGHT
ON MONASH STEAM PRESSURE REDUCING VALVES
AND REMAIN THE SAME
WHETHER SPECIFIED OR NOT

WRITE FOR INFORMATION

NEW YORK MONASH-YOUNKER CO. CHICAGO



AUXILIARY HEATING SECTION

is also in use for heater for utilizing exhaust heat of gasoline engines

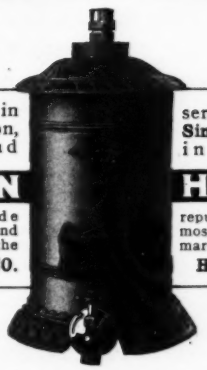
Anderson-McCutchen Co., Peekskill, N. Y.

For **Efficiency** in fuel consumption, service, **Economy** **Simplicity** in construction, and in Durability

LAWSON HEATERS

have a world-wide reputation. The most generally used and most satisfactory range boiler heater on the market.

LAWSON MFG.CO. Homestead, Pa.



WE GUARANTEE

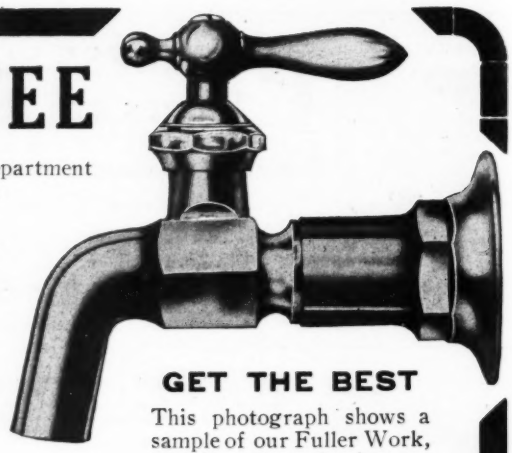
that no goods will go through our shipping department that are not perfect in each detail, *absolutely so.*

THE GENERAL EXCELLENCE

of our entire line will stand the most critical inspection, and we sell only to the jobbing trade.

OUR FULLER WORK

is up-to-the minute in appearance and efficiency, made so by our continual adoption of every improvement known, coupled with expert workmanship.



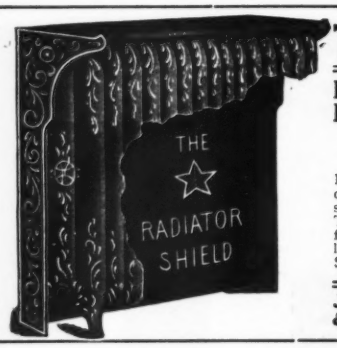
GET THE BEST

This photograph shows a sample of our Fuller Work, but the real goods show up better than the picture. They certainly are *the goods.*

Ask your Jobber to show you samples

BURLINGTON BRASS WORKS

BURLINGTON - WISCONSIN



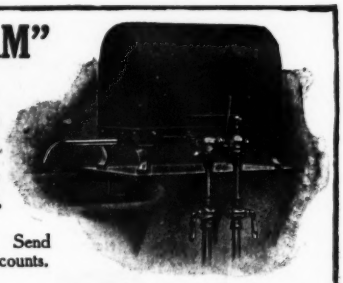
THE STAR
RADIATOR DEFLECTOR

For Hot Water or Steam Radiators

Prevents discoloration of walls and ceiling and saves cost of decorating They are used in the finest private and public buildings in the U.S. Send for circulars.

J. RUTHERFORD & SON, Akron, O.

THE "ADAM"
Instantaneous
WATER HEATER



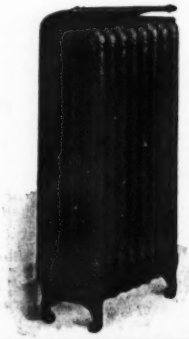
Sold to the trade only. Send for catalogue and discounts.

Manufactured by
ADAM'S STEEL & WIRE WORKS, JOLIET, ILL.

A Profit Maker for You
IS OUR
Acme Radiator Shield

Fitted with Copper Water Pan for supplying moisture. Made with a dust gutter for catching the dust circulated by the radiator. Made of corrugated galvanized iron and ornamental cast ends. Easy to Sell. Easy to Install

W. H. Johnson & Son Co.
943-945 Fort Wayne Avenue
INDIANAPOLIS, INDIANA



THE BEST
Protector for walls are
"A. & J." Radiator Shields.

Finished in any style to fit any radiator.

Send for prices.

Andrews & Johnson Co.
CHICAGO, ILL.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

Klymax

Mercury Heat Economizer

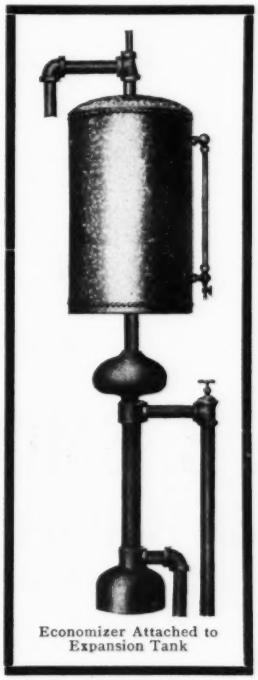
FOR HOT WATER PLANTS

SAVES FUEL

INCREASES CIRCULATION

WORKS AUTOMATICALLY

INCREASES RADIATOR EFFICIENCY APPROXIMATELY 25 PER CENT



Economizer Attached to Expansion Tank

LESS RADIATION REQUIRED AND SMALLER SIZE PIPE AND FITTINGS

SURE REMEDY FOR FAULTY PLANTS

EASILY INSTALLED

The Klymax Mercury Heat Economizer possesses several characteristic advantages which make it superior to all others. All progressive steamfitters should investigate the merits of this highly successful, though simple, device. Our new booklet illustrating and describing same, sent free on request.

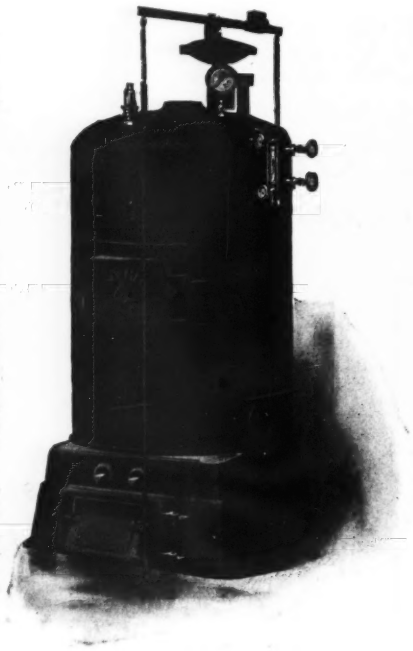
Kellogg-Mackay-Cameron Co.

Klymax Boilers & Kewanee Radiators

Heating and Plumbing Supplies

General Offices "K-M-C" Building

Minneapolis CHICAGO Seattle



Specify

The MENLO

Boiler

For Steam or Water Warming

IN SIX SIZES

CAPACITY:

Water, 165 to 750 sq. ft. Steam, 275 to 450 sq. ft.

WRITE FOR CATALOG.

THE H. B. SMITH CO.

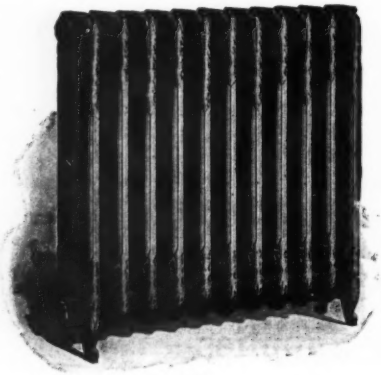
Manufacturers of Boilers and Radiators

WESTFIELD, MASS.

Pacific Coast Agents:
HOLBROOK, MERRILL & STETSON,
Oakland, Los Angeles and
San Francisco, Cal.

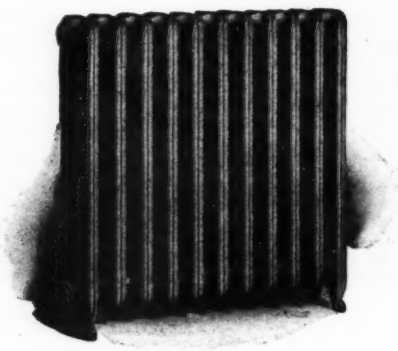
SALESROOMS:
39 E. Houston Street, New York.
728 Arch Street, Philadelphia.
138 Washington Street, No., Boston.

European Agents:
AUGUST EGGERS,
Bremen and New York.



IMPERIAL

Single, Two and Three Column Steam and Water.

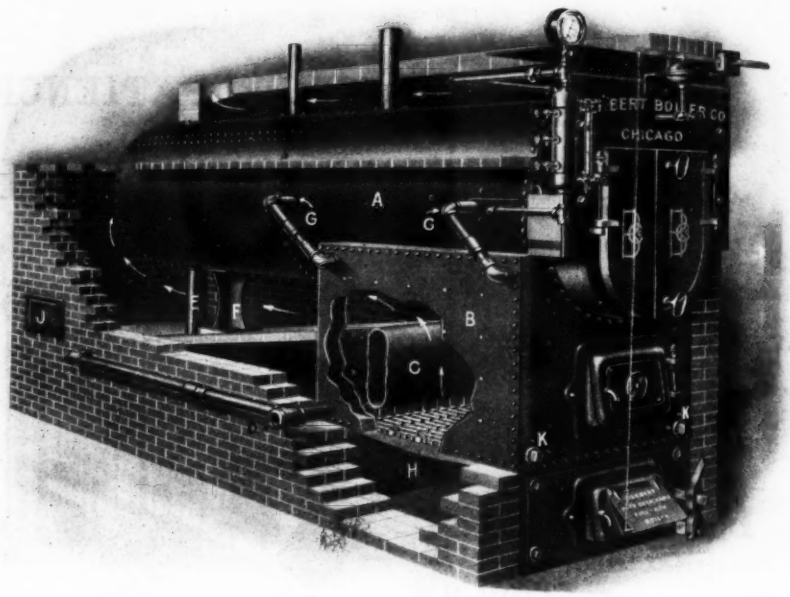


PRINCESS

Single, Two, Three and Five Column Steam and Water.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

A NEW BOILER—A GOOD ONE



¶ A GREAT IMprovement over the standard fire-box boiler. It increases heating capacity in same amount floor space. Free and rapid circulation of water. Easier to handle and set in place. Flues accessible for cleaning. We will gladly submit testimonials and proof of its great economy and satisfactory service while in daily use.

Herbert Boiler Company
Root and La Salle Streets
CHICAGO

YOU ARE SURE OF PERFECTION
AND THERE'S NO RISK IN BUYING

Prudential Boilers

Every boiler that leaves the plant has been set up and made to stand "Test Perfect" and you can depend upon it every time.

WRITE FOR CATALOGUE

PRUDENTIAL HEATING CO.
AKRON, OHIO

Do It Now

GET OUR CATALOGUES
AND PRICES

Everything in the Heating Line.

QUALITY
PRICES
SERVICE

Everything shipped from one point

Manufacturers Selling Agents

CRARY COMPANY
OMAHA, NEB.

The old unsatisfactory way.

PATIENCE IS A VIRTUE

But when you try that old way of assembling a radiator don't you just have to swear and cuss at the way "the pesky thing" acts? Well, profanity and virtue are strangers.

YOU DON'T NEED PATIENCE

or cuss words, or a Helper when you use

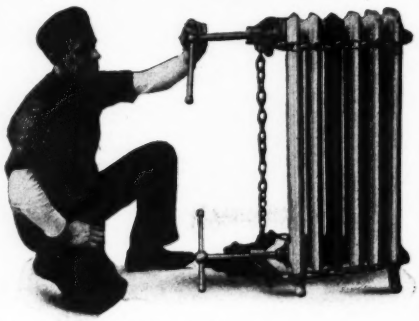
PETERSON'S PUSH NIPPLE RADIATOR VISE

IF YOU SAW IT WORK YOU'D WANT IT

Every steamfitter should get in touch with me at once and make a test of this time and trouble saver. This **Radiator Vise** makes absolutely tight joints every time—no matter how obstinate the job.

WRITE ME TODAY FOR PARTICULARS

H. L. E. PETERSON
Sole Manufacturer
51 DOUGLAS AVE. ELGIN, ILL.



The new and easy way

Simple--Direct--Comprehensive

ALLEN'S

"Testing Drainage, Plumbing and Gas Piping"

A Practical Treatise *By a Practical Man* *For Practical Men*

Covers the subject concisely but thoroughly. ¶ Contains full instructions for testing all kinds of piping. ¶ Tells you what to look for and how to look for it. How to detect and locate leaks.

FULLY ILLUSTRATED

We strongly recommend this book to all interested in plumbing, and steam and gas fitting generally. It is thoroughly reliable, covers the ground and is one of the best guides we know of for pipe testing.

Price, 25 cents—postage prepaid

DOMESTIC ENGINEERING, Chicago, Illinois

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

CERTAINLY SIR!

That's our reply to all queries asking if we can ship soon

SHIP SOON?

Try us once—that's our special specialty and all good goods too!

MIDLAND SUPPLY COMPANY

THE NEW UP-TO-DATE SUPPLY HOUSE AT DAVENPORT, IOWA, ON THE MISSISSIPPI RIVER THE CENTRAL MARKET OF THE MIDDLE WEST

We carry at all times a full and complete Stock, and can fill and ship orders promptly. On account of our central location and excellent shipping facilities, the goods will reach you quickly and without delay. We can save you worry, time and money.

WE CAN SUPPLY PLUMBERS, FITTERS, FACTORY AND MILL SUPPLIES, ENGINES, BOILERS AND RADIATION PROMPTLY

LET US QUOTE YOU PRICES WRITE TODAY

MIDLAND SUPPLY COMPANY

600-622 E. FOURTH ST., ADJOINING C. R. I. & P. FREIGHT DEPOT DAVENPORT, IOWA
PHONES: BELL NO. 11 UNION ELECTRIC NO. 11
JOHN CORRY, PRES. A. D. HATHAWAY V-P AND SEC'Y FR. WERNENTIN, JR., TREAS.

FOR YOUR
PROTECTION

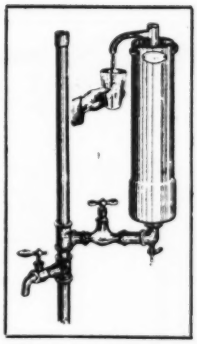
You will never be disappointed with results from genuine Multatones~ You will be if you permit yourself to be imposed upon by imitators. The trade-mark shown above is your protection. You will find it plainly marked on all genuine Multatones. If you don't see it, there is something wrong.

VALUABLE INFORMATION FREE.

We invite correspondence regarding MULTATONES from all users of engraving. The *eight important particulars* in which MULTATONES excel half-tones are convincingly covered in a little folder which we have just issued. You will be the loser in more ways than one if you fail to get a copy. We will gladly mail it together with proofs upon receipt of request.

Chicago Engraving Co., 351 Wabash Ave., Chicago, Ill.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

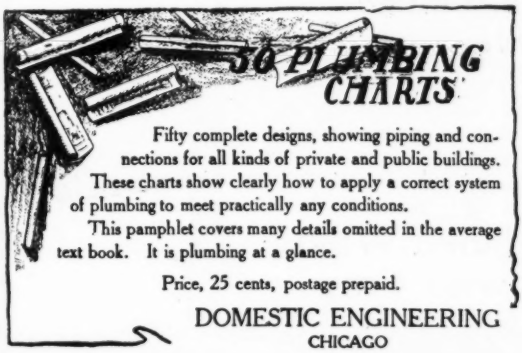


Larger Sizes on Application.

No. 1 **For Goodness Sake Sell The "Missouri" Water Filter**

It will filter from 5 to 15 gallons per hour. Easily attached to water pipes. Easily cleaned. Child can operate. Built mechanically correct for simplicity and purifying qualities. Send for circular & prices.

Chas. F. Huber
1310 Howard St., Omaha, Neb

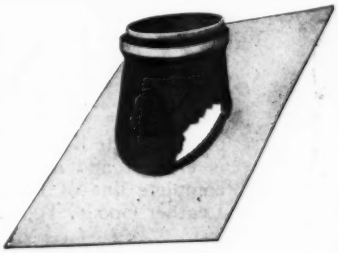


Fifty complete designs, showing piping and connections for all kinds of private and public buildings. These charts show clearly how to apply a correct system of plumbing to meet practically any conditions. This pamphlet covers many details omitted in the average text book. It is plumbing at a glance.

Price, 25 cents, postage prepaid.

DOMESTIC ENGINEERING
CHICAGO

Bell Roof Flashing



The Latest Improved Roof Flashing

SPECIAL FEATURES:

1. Iron band near top of lead casting aids in caulking around the soil pipe.
2. The sheet lead is brought up on the inside of casting which will prevent leaking if casting breaks loose from sheet lead where soldered.

BEST FLASHING MADE TODAY
Made in all Sizes Ask Your Jobber

BELL SPECIALTY CO.
DES MOINES, IOWA.

Do you want to save ¼ ?

or more on your radiation, piping and fittings on you next job? You can certainly do it when you use the

PHELPS HEAT RETAINER
For Hot Water Heating Systems

THERE IS NO MERCURY to be drawn back into the system and lost

OUR GUARANTEE

is very binding, and if you try the Phelps Heat Retainer and it is not all and more than we claim, send it back at our expense. The Phelps Heat Retainer is simple but none the less effective.

WRITE TODAY FOR OUR CIRCULARS

Ideal Heating Company
OSKALOOSA, IOWA

WOLVERINE BRASS WORKS GRAND RAPIDS MICHIGAN

EVERY ARTICLE W TRADE MARK B GUARANTEED

REGISTERED

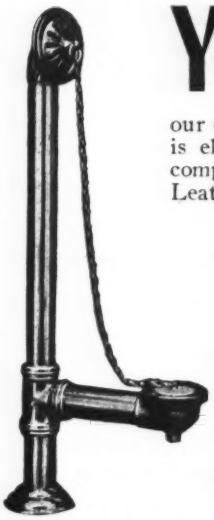
WOLVERINE BRASS WORKS GRAND RAPIDS MICHIGAN

YOU SHOULD SEE

our complete line of Waste and Overflow Combinations. It is elegant and complete. We make the finest and most complete line of Plumbers' Specialties, Brass, Rubber and Leather Goods, Tools, Etc.

Wolverine Combined Waste and Overflow

FOR BATHS



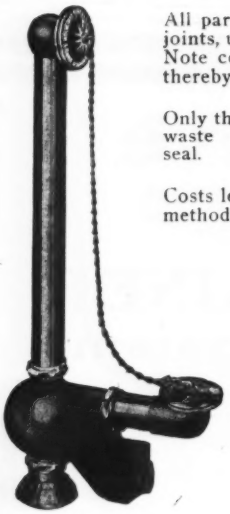
Nos. 398 and 399

No stamped parts. Cast brass. Hexagon nuts. Heavy cast brass overflow strainers with 33 spaces for customers' name and address. All our waste and overflow fittings are furnished with special beveled washers, and will line up on any slant of tub.

Nos. 400 and 401

Wolverine Combined Waste and Overflow with Trap

FOR BATH TUBS



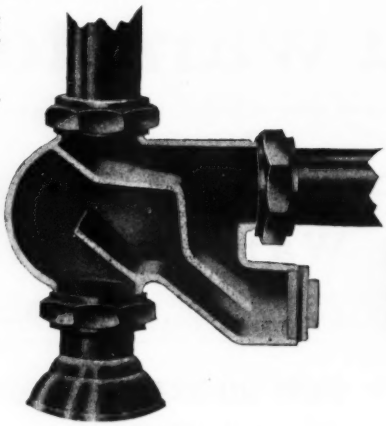
No. 390—Plain

All parts except tube are cast brass. Furnished with slip joints, unless otherwise ordered. Ground joints if ordered. Note convenience of overflow and waste being on same line, thereby requiring no "special" roughing-in.

Only three inches of waste above water seal.

Costs less than other methods.

Ask for Our Big Catalog "F"



Patented, Nov. 29, 1904

No. 391—Vented

Wolverine Brass Works

Main Office and Factory:

GRAND RAPIDS, MICH.

Branch at
SAN FRANCISCO, CAL.
206-8 Natoma Street

Branch at
CHATHAM, ONT.
Canadian Wolverine Co., Ltd.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

It's a Good Boiler Coupling

The "Kewanee"

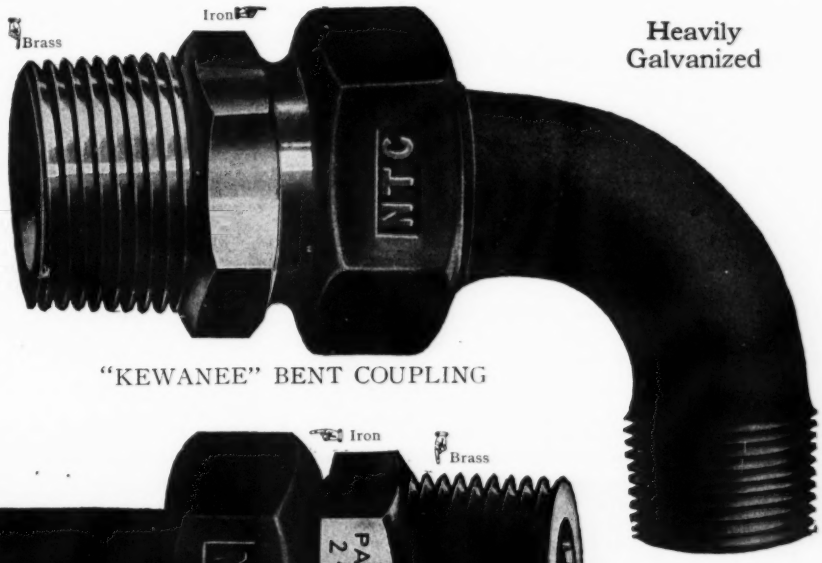
Brass

Iron

Heavily Galvanized

Cannot Corrode

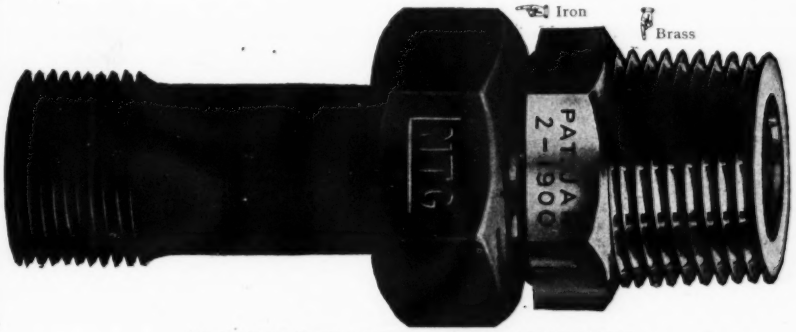
Easy to move



"KEWANEE" BENT COUPLING

Iron

Brass



Four couplings in a set

Three bent, one straight

"KEWANEE" STRAIGHT COUPLING

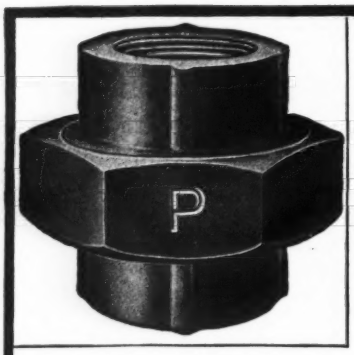
The successful man usually makes his success by using the best obtainable material and workmanship—if you are not using "KEWANEE" BOILER COUPLINGS you owe it to your success to put these couplings into your specifications. Write and ask for explanation—information—details.

NATIONAL TUBE COMPANY

General Sales Offices: Frick Building, Pittsburg, Pa.

DISTRICT SALES OFFICES:

New York, Hudson Terminal Bldgs.	Pittsburg, Pa., Frick Bldg.	Atlanta, Ga., Candler Bldg.
Philadelphia, Pa., Pennsylvania Bldg.	Denver Colo., Majestic Bldg.	Chicago, Ill., Com'l Nat. Bank Bldg.
St. Louis, Mo., Third Nat. Bank Bldg.	San Francisco, Cal., Crocker Bldg.	New Orleans, La., Maison Blanche
Salt Lake City, Utah, Dooly Bldg.	Portland, Ore., Wells-Fargo Bldg.	Seattle, Wash., Alaska Bldg.



Plumbers and Steam Fitters who have used

"P" Malleable Iron Lip Unions

Know that they are designed to meet all working conditions to which Unions are subjected and that they give satisfactory results for pressures not exceeding 150 lbs.

Why use an EXPENSIVE Union designed for high service when a "PITTSBURGH" MALLEABLE IRON LIP UNION will answer?

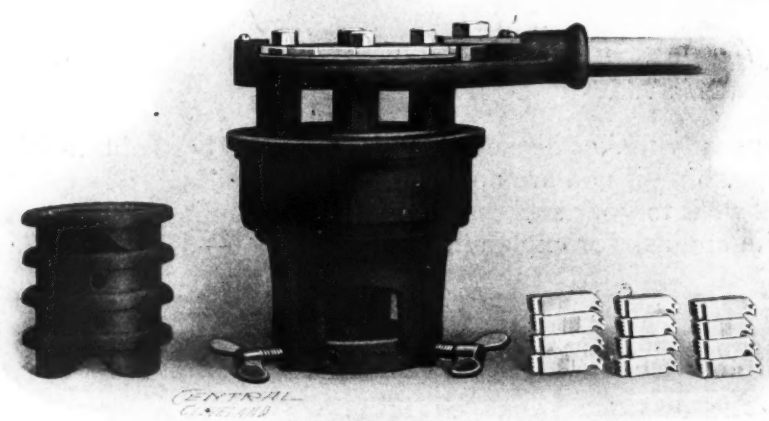
A Few Features

1. **"P"** Unions are made from highest grade refined air furnace iron. Compare this iron with that of other manufacturers using cupola iron. A hammer test will tell.
2. **"P"** Unions are proportioned sufficiently heavy to withstand the excessive strains frequently placed on these fittings when they are put together. The pipe ends are made of sufficient strength to resist all strains from the wrench.
3. **"P"** Unions are recessed in the pipe ends, thus allowing the pipe to be easily started in same. They are threaded with taper taps true to Brigg's standard gauge and are guaranteed to be in perfect alignment.
4. **"P"** Unions are made with a coarse thread in the nut, thus assuring strength and allowing the union to be easily connected.
5. **"P"** Unions are being used under 150 lbs. air pressure by some of the largest manufacturers in the country and we never have had a complaint.

PITTSBURGH VALVE & FITTINGS CO. General Offices and Works BARBERTON, OHIO.

Mechanical Tests Have Proved

The "Sandusky" Pipe Threading Machine is the easiest cutting machine made



No. 1 "B" Ratchet Stock. Threads 1 in., 1¼ in., 1½ in. and 2 in. pipe

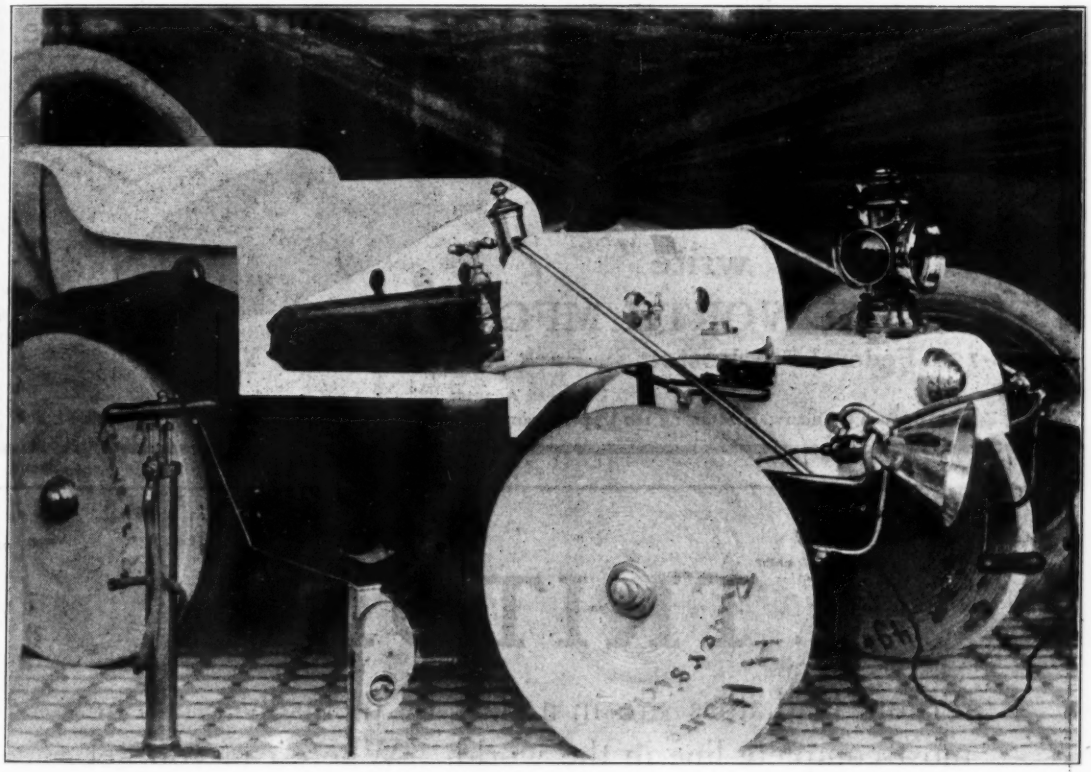
The **"SANDUSKY"**

pipe threading machine is unique and in a distinct class by itself—for while none of the **essential features** are lacking, many of the cumbersome, unnecessary features are entirely eliminated. This means simplicity combined with direct efficiency. The "Sandusky" is a delight to every user—and the army of users is increasing at a rapid pace.

Send for circulars and price list

THE THREADING MACHINE CO. Sandusky, Ohio

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.



"A World Beater." A novel contrivance arranged as a window display on the premises of the Hinde Hardware Company, at Riverside, California.

Be sure you are getting a Genuine Stillson Wrench when you pay good money for it.

Look for the

STILLSON TRADE MARK

If your dealer does not keep the Genuine Wrench write

THE WALWORTH MFG. CO.

128-136 Federal St., Boston Park Row Bldg., New York

European Agents:

Aug. Eggers, Bremen, Germany; H. Munzing, 180 Upper Thames St., London, England; H. Munzing & Co., Paris, France

TRITON

Triton Radiators are in a class by themselves. The most complete line in the world. Where can you get 1 col., 2 col., 3 col., 4 col., 5 col., wall and Flue Radiators all bearing the same design? They are only made in the TRITON Factory at Dunkirk, N. Y.

Send for a catalogue

UNITED STATES RADIATOR CO.

DUNKIRK, N. Y.

BRANCHES: NEW YORK WASHINGTON CHICAGO MINNEAPOLIS

WAREHOUSES: JERSEY CITY CHICAGO MINNEAPOLIS

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

DOMESTIC ENGINEERING

PLUMBING HEATING LIGHTING MILL SUPPLIES

Weekly, $1 a Year. Chicago, Saturday, August 1, 1908. Whole No. 816. Vol. XLIV. No. 5.

A Good Man Gone Wrong

There are always two sides to every debatable proposition. Until a demonstration has been made and proven, there is always room for differences of opinion. While "Domestic Engineering" has pronounced views on certain evils which have brought some departments of the plumbing, manufacturing and wholesaling trade into disrepute, and has expressed these views fearlessly and rather persistently, it is not a part of our program that those who differ from us shall not have equal opportunity to express their views. Hence we print the following communication from a very prominent manufacturing jobber, one whose words have for many years been treated with great respect by the trade:

"**'Resale' prices are impossible and unlawful. 'Inferior goods' is a hob-goblin.** It will take more than the authority that made the laws of the Medes and Persians unchangeable, to fix prices on a multitude of manufactured goods passing through the hands of a multitude of wholesalers, to say nothing about the retailers. **The plan would subvert the entire structure of free trade.** There may be comparatively little harm in small trade agreements, which can be maintained only at moderate prices. I would about as soon have the little customer of Podunk have the right to set the price at which I shall sell to him, as to let it be set for me by the big factory at Cattaraugus.

"On the question of quality. **More than one quality is wanted and needed.** The $1,200 cottage does not want the same quality or finish of bed-stead or mantel or closet wood-work that is wanted in the $10,000 residence or the $50,000 mansion or the half million dollar hotel.

Fraudulent representations about quality is a figment of the imagination. No one intentionally patronizes a fraud or fakir. He soon learns better or gets starved out of business. Business of that kind is about as rare as cyclones.

"Every manufacturer and every wholesaler knows that it pays him best to sell the highest quality that he can persuade his customer to buy; the customer stands in the same relation in his selling and therefore in his buying. **It pays the best because it is the largest sale, bears a better rate of profit, gives better satisfaction and builds up and holds trade better.** Everyone knows that the conspicuous successes in any of our lines are the houses which have made or sold the highest grade of goods. **That does not mean that they have not also made or sold a second or standard grade,** good of its kind, the kind that is good for the purpose intended, the kind that a considerable portion of the country wants.

"There are many ethical and some economic blunders and evils in trade, as in all human affairs. None of them I think, is so easily self-regulated as the alleged evil of inferior goods. **The process of elimination is a standing warning against a tricky course in business.** The advantages of manly, candid and gracious methods of business, quality at least as good as represented and wanted, are self evident **and rare indeed are the exceptions who disregard them."**

We cannot agree with our distinguished correspondent. Even Jove nods. In nearly every vital statement made in the foregoing communication we believe the writer is in error.

"Resale prices are impossible and unlawful," he says. According to this hypothesis it is impossible and unlawful to tell your agent what he shall sell your goods for and see that he does it. I advise our correspondent to look up the legislative acts of Missouri passed in 1907, **whereby the question of resale price is practically made operative by law and compulsory.** It also would be well for him to **read** the **decision** of the **United States Circuit Court, Sioux Falls, S. D.,** in the case of **Montgomery Ward & Co.** versus **the South Dakota Retail Merchants' Association,** in which the court **recognized the right of dealers to formulate and carry out a policy which would protect their own interests against unfair competition.** The United States Court for the District of Illinois also placed its stamp of approval upon **individual contracts involving resale price. It would be against public policy and illegal for any court to restrain individual acts** of this nature, and consequently **subversive of sound business principles** to declare that **an individual has no proprietary rights in the goods he manufactures.**

Our correspondent makes the vital blunder of mixing up with individual efforts of this nature a combined effort, which, in the eyes of the law, would savor of a conspiracy in restraint of trade. Such a case is easily understood by referring to the **decision** of the **United States Circuit Court,** Indiana, in which there is a discussion of the question of **conspiracy in restraint of trade, which is an entirely different assumption.** What an individual may do to protect himself in the eyes of the law might **assume a threatening aspect were the same policy extended in a collective sense to such a degree as would create a monopoly.** In such cases the courts would act to preserve the rights of the entire people and relieve them from the embarrassment of a possible extortion.

Our correspondent seems entirely to have lost sight of the aims of those who are in favor of a resale price. In fact, every day of his life, when selling goods, **he is doing, and should do, business on a resale basis,** unless he has a sliding scale on everything he carries in stock. If **he** is on a sliding scale basis, he should hang a cut rate sign over his door so that customers may buy with their **eyes open** to the fact that there is a "better price" obtainable.

Even a close study by our learned friend of the decision of Circuit Judge Reynolds, of St. Louis, in the laundry case handed down in his **home city** July 15 last, would undoubtedly **help open his eyes to the fact that in all these cases the courts have an eye out to protect the public only when there is a monopoly created through conspiracy.** The drug trust decision

(Concluded on page 121)

Heating and Ventilating Engineers

Summer Meeting at Niagara Falls, July 24-25, 1908

Niagara Falls, N. Y., July 24-25.—[Special.]—The semi-annual, or **summer meeting, of the American Society of Heating and Ventilating Engineers,** was held Friday and Saturday at the Cataract Hotel, a fair attendance present.

The meeting was called to order Friday morning, **by the President, James Mackay,** of Chicago.

Attendance.

The official register showed the following persons in attendance:

James Mackay, President, Chicago.
J. D Hoffman, 1st Vice-President, Lafayette, Ind.
Wm. M. Mackay, Secretary, New York.
Frank K. Chew, New York.
Harry S. Martin, Dunkirk, N. Y.
S. F. McDonald, Cleveland, O.
James H. Davis, Chicago.
Joseph Graham, New York.
J. P. Dugger, Chicago.
C. E. Oldacre, Toronto.
F. E. Ellis, Toronto.
J. A. Donnelly, New York.
W. A. Johnson, Indianapolis.
C. Bushfield Kennedy, Pittsburg.
Geo. D. Hoffman, Chicago.
Joseph A. Gorton, New York.
Ray D. Lillibridge, New York.
H. W. Whitten, New York.
H. Howard Armstrong, Pittsburg.
A. S. Armagnac, New York.
J. F. Siegel, Chicago.
S. C. Smith, Scranton, Pa.
M. E. Hinshaw, Buffalo, N. Y.
Arthur Ritter, New York.
John B. Morgan, Schenectady.
Edwin C. Evans, Syracuse, N. Y.
E. E. Jorolomen, Niagara Falls.
A. O. Jones, Battle Creek.
H. L. Mosher, Dowagiac, Mich.
W. R. Stockwell, Irvington, N. Y.
H. S. Welsh, Rochester, N. Y.
David Miller, Toronto, Ont.
Weston Wrigley, Toronto, Ont.
H. E. Kenny, Detroit, Mich.
John B. Ruckel, Buffalo, N. Y.
H. J. Schoennau, Buffalo, N. Y.
Howard T. Gates, New York.
F. F. MacNichol, Oshkosh, Wis.
O W. Dewhirst, Barker, N. Y.
F. T. Seelye, Barker, N. Y.
Jno. K. Allen, Chicago.
W. W. Macon, New York.
E. F. Capron, Chicago.
R. M. Stackhouse, Chicago.
A. H. Hunter, Buffalo.
C. H. Cornes, Lockport, N. Y.
Wm. Bramer, Camden, N. J.
E. N. Squires, Buffalo.
Theo. Weinshank, Indianapolis.
Daniel Stern, Chicago.
Charles R. Bishop, Lockport, N. Y.
Sam Kauffman, St. Louis, Mo.
F. S. Whitelaw, Buffalo, N. Y.
C. B. Thompson, Buffalo, N. Y.
Eugene Bradley, St. Louis, Mo.
L. A. Cherry, Buffalo.
Chas. W. Fortune, Galt, Ont.
J. Barnum, New York City.
T. B. Cryer, Newark, N. J.
J. J. Blackmore, New York.
E. S. Berry, Philadelphia.
U. G. Scollay, Brooklyn.
John F. Hale, Chicago.
Louis K. Berman, New York.
W. G. Le Compte, New York.

Ladies.

The following ladies were also present at the meeting:

Mrs. C. B. Thompson.
Mrs. L. A. Cherry.
Miss Weinshank.
Mrs. W. H. Johnson.
Miss Helen G. Racek.
Miss Jean MacNichol.
Mrs. C. A. Oldacre.
Mrs. Theodor Weinshank.
Miss E. Olive Davis.
Mrs. Jno. K. Allen.
Mrs. Jas. Mackay.
Mrs. Wm. Mackay.
Miss Mackay.
Mrs. O. A. Morse.
Mrs. Sam Dugger.

Committee on Relative Corrosion.

Thomas N. Thomson, of Scranton, Pa., sent a letter stating that the committee on **"relative corrosion test"** had nothing definite to offer yet, but was arranging to put in a test on a feed-water pipe line to some boilers in a large hotel. This pipe line corrodes very rapidly and has been a source of expense and annoyance to the owners.

New Members.

Announcement was made of the election of the following members:

Members.

James B. Badger, 1 Madison Ave., New York.
Oliver L. Badger, 101 Beekman St., New York.
Joseph H. Burton, 1200 Michigan Ave., Chicago, Ill.
John T. Bradley, 3834 Olive St., St. Louis, Mo.
Philip M. Beecher, 113 Kirk Ave., Syracuse, N. Y.
William D. Clark, 121 Bridge St., Willimantic, Conn.
Byron T. Gifford, Frankfort, Ind.
Robt. L. Gifford, Manhattan Bldg., Chicago, Ill.
Wm. Grier, 630 Bellefonte St., Pittsburg, Pa.
William H. Johnson, 945 Ft. Wayne Ave., Indianapolis, Ind.
Theo. Karr, Jr., Belleville, Ill.
Dwight D. Kimball, 437 Fifth Ave., New York.
Francis W. McGuire, 208 N. 2d St., Rockford, Ill.
Harry M. Nacey, 315 Wabash Ave., Chicago, Ill.
George J. Phillips, 184 E. Indiana St., Chicago, Ill.
Frank N. Speller, 1828 Frick Bldg., Pittsburg, Pa.
D. Stephen Tallman, 1133 Summit Ave., Jersey City, N. J.

Associate Members.

Raymond M. Stackhouse, 38 Dearborn St., Chicago,
Herbert W. Whitten, 1165 Broadway, New York.

Junior Members.

Charles W. Miller, 316 Mineral St., Milwaukee, Wis.
Harry W. Terry, 1200 Michigan Ave., Chicago, Ill.

Reasons Why the Science of Heating and Ventilation Should be Observed.

Professor J. D. Hoffman, of Lafayette, Ind., read a paper on the foregoing subject. It follows herewith, and should be read by all contractors for steam, hot water and hot air heating:

1. **General Requirements.**—The science, if such it may be called, of heating and ventilating engineering, is one that is founded almost completely upon the laws of thermodynamics. It is not what one might call an exact science, but, in its rational design and application, the engineer may work with a reasonable degree of

exactness. Most of the points of interest in the subject may be theoretically developed, yet, as in all branches of engineering design some parts require theory modified by good judgment and the personal equation of the designer. In such cases empirical data, found by tests upon similar apparatus, are not only good things to apply as checks, but at times are absolutely necessary because of the lack of any rational information on that part of the subject. Fortunately, such cases are the exception rather than the rule, for with the properly applied principles of thermodynamics there is scarcely any part of the subject which is not possible of rational solution. Because of the fact, however, that some features of the work are as yet empirical and not as definitely understood as they should be, this is no reason why those who install heating and ventilating apparatus should disregard **all** laws and feel justified in installing a job that is empirical in all its parts, and one which shows scarcely any of the earmarks of theoretical investigation. The time has surely come when it may be demanded of all men who install such apparatus that they follow closely to fundamental principles and be prepared to furnish proof for any step taken in their work.

2. **Letting of Contracts.**—Contracts for heating and ventilating apparatus usually are let in one of the four following ways: **(a)** Some person, called for convenience the **dealer contractor,** draws up a rough layout of the work, guarantees to install satisfactory apparatus for a stated amount of money, buys his apparatus from the manufacturer, installs it according to his own personal ideas, or according to the plans laid down by the manufacturers, and in a general way guarantees it to give good service; **(b)** a manufacturing firm draws up a plan and contracts to install, for a stated amount of money, satisfactory apparatus, usually made by the same company, guaranteeing its successful operation; **(c)** a responsible engineer is retained, who draws up plans and specifications for the work, and, upon competitive bids, the successful contractor installs the apparatus in accordance with these plans and specifications, the engineer being the judge of the quality of the work and materials; **(d)** a responsible engineer designs the system and assumes all the responsibility in its erection, looking toward a certain required output or result. Materials are purchased in the open market and installed to his satisfaction, and after completion, if the final tests are acceptable, the purchaser pays the bills and takes charge of the completed plant. The last method is not much used in heating and ventilating installation as yet, being confined largely to power and manufacturing plants where a certain definite output of finished material is desired, and will not be further discussed; methods **(a)** and **(b)** being applicable to small installations and **(c)** to larger and more important ones.

3. **Residence Heating by Furnaces.**—Of all the uncertain and **rule-of-thumb** installations, probably the furnace heating of residences can claim the greatest share. Competition among the furnace manufacturers has been so great that we have the country flooded with furnaces ranging in quality from good to positively bad. In order to place the furnaces, it has been the desire, and this is a legitimate one, to simplify construction, to remove features not absolutely necessary, to cheapen manufacture, and in many cases to so rate the furnace that the claims could be realized only under the best conditions of installation, such as would be expected under test conditions and not under conditions as found in average service. Of the above mentioned points, the last one should not obtain in any case, since a furnace should be so rated as to realize its claims even under somewhat unfavorable conditions and the other points should hold good only in so far as not to develop an inferior type of furnace.

4. In addition to what has been said about the furnace, it is also true that the furnace manufacturer has been **so busy cheapening his product** and **placing orders** that he has been selling to Smith, Jones and Brown to install according to their own notions of engineering work, and has not had time to investigate the engineering reputation of Smith, Jones and Brown to see if they would probably bring credit to his firm, nor has he had time to keep his own finger upon the pulse of the job to see if the plant is working well after it is installed. This apparent indifference of the manufacturer to the final results is probably the greatest source of trouble, and is that which gives color to the public mind and decides the buyer against furnace heat, because, as he has some right to argue, "Furnace plants are usually installed so as to make them inferior and defective, consequently the system is in itself defective. It is fast becoming a fact that the correct furnace job is the exception rather than the rule, and some remedy should be applied very soon. The fault is not in the system. Furnace heating, if properly installed, is healthful, cheap and scientific. Neither can it be said that the fault all rests with the manufacturer. The purchaser is to a certain degree to blame in that he is willing to let the contract to any one who cuts to the lowest price regardless of the quality of the man who takes the contract or of the apparatus which he represents. In certain localities it has become almost impossible for a man of reputation and integrity to obtain a contract, because he expects to live up to the "full intent and meaning" of the contract, and proposes to stay with his work until it is fully satisfactory, regardless of cost. Such a man usually presents an estimate that is sometimes considered high when compared to some others, but when the expense of changes and repairs is taken into account it would in many cases be the cheaper proposition.

It does seem unfortunate that there are men in the business who are in it **exclusively for the dollars,** and care little as to the results. If such men were held strictly to the satisfactory fulfillment of the contract, even though it were to the substitution of an entirely new system, there would be less careless and haphazard bidding, and part of the troubles at least would be remedied.

5. Another phase of the heating business which is a frequent source of annoyance and error is the relation of the heating engineer or the contractor installing such work to the architect. The house plans are usually made without the consideration of heating; the heating plans are then supposed to be made to fit the house plans. Now what the average architect does not know about the heating business would fill many books, but his own private opinion of his own worth in such matters is highly satisfactory, and consequently there is set up a different viewpoint between the designer of the building and the designer of the heating apparatus, much to the discomfort of the latter and to the detriment of his work in many cases. To be just to both, the system of heat should be selected first and then allowances should be made in the building plans for its installation. This is no hardship to the architect, since many slight changes, any one of which would possibly be in favor of the heating engineer, may be made in his plans without causing any trouble. Some of these points may be mentioned as follows: The size and location of the chimney; the running of the cellar partition walls to accommodate the location of the furnace and the coal bin; the height of the basement ceiling to allow sufficient inclination of the leader pipes; the construction of the partition walls between the rooms to allow for riser pipes of sufficient size to heat large upstair rooms; the planning of the walls to avoid horizontal runs of heat ducts in the second floor to reach a room otherwise inaccessible; and other points not necessary to mention.

6. All heating engineers know that the range of location of a furnace relative to the house plan is very limited, and that in many cases it is an absolute necessity, after the house plan is completed, to set the furnace out of this desired location, thus compromising the efficiency of the system; also, that the basement ceiling in many cases is so low that the leaders require to be run nearly horizontal, thus reducing the draft in them; also, that a 6-inch studded wall in many

cases could easily have been substituted for the 4-inch, with little additional cost, and have improved the system immensely; also, that certain walls absolutely prohibit the running of stacks to the desired spot in the room, and that with a slight change, this could have been arranged without in any way injuring the architect's plans. Such in brief are some of the troubles that the conscientious heating engineer or contractor faces when he proposes to do his work after the building plans have received the O. K. of the architect.

7. Finally, however, the purchaser himself occasionally offers objections to the proper design of the system because of the desire to economize, although false economy it may prove to be in the end. Occasionally one hears the advice, "Don't heat the chamber rooms on the second floor very warm, because I like a cold sleeping room." Advice which, if heeded, would be good nine times in ten, but the tenth time when it is needed, it is needed badly, and the system and the man who installed it are both censured. How much better to have made the job right at first and permit the owner to regulate the damper to suit his needs, even to closing it entirely. The only word that could be spoken against this way of doing things is because of the very small increase in first cost; on the other hand, the favorable comment would be: "A system that is correct and one that **will heat** if you want it to." Good advice to all men installing residence heating system is, "Heat every room as though it were to be used as a living room, and let the owner regulate to suit his needs."

8. **Residence Heating by Hot Water and Steam.**—Not so much can be said about the failures in **hot water and steam systems,** because, as a rule, they are planned with greater care and by men better qualified to do the work. However, of all the difficulties experienced in both systems, by far the greater part can be charged to the hot water work. This is to be expected, when one remembers how very small is the motive force causing circulation in the water and how easily this may be counteracted by small pipes, many short turns or improper laying. Short cut rules for proportioning radiation are, also, in too frequent use even by those well grounded in the subject, and from whom could be demanded a more rational course. Residence heating by hot water and steam is fairly well standardized, and if designed from fundamental laws and principles, and installed with care and good judgment, should in every case give good results. Some of the points wherein these systems give trouble are as follows: Chimneys too small; heater or boiler too small; heater or boiler too far from chimney; heater or boiler set too high, thus giving too little pitch to the main piping; mains too small, thus killing the flow of the water and steam, also bringing the water line of the boiler too near the level of the lowest radiation; radiation too small and improperly placed; and other minor points.

9. The architect is responsible for the location and capacity of the chimney, and, in a degree, to the location of the heater or boiler, for, as he plans the basement, the heating apparatus must be located to suit. Many chimneys are poorly located and are of improper size, and when the heater or boiler does not fire well the responsibility of the architect in the matter is seldom thought of, and the censure is placed upon the shoulders of the man who installed the heating apparatus. This feature of the work is where the heating engineer can do some missionary work in the line of architectural design. The other points mentioned are directly chargeable to the man who designs the heating system, and there is little excuse for his mistakes. All should know that the surface of mains and branches should be counted as radiation surface, and that the efficiency of the heater or boiler is somewhat reduced after having been in service for a time. Because of this latter point, a selection would be made having a capacity about 25 per cent greater than the total radiation found. When such a generator is properly set, all pipes in the system will have a satisfactory fall, the minimum height of circuit will be sufficient to cause a good circulation, and the pipes will be so proportioned and attached as to avoid short circuiting or water hammer. Too small mains on a steam system have a tendency to force the water on the return end back into the radiators and cause "flooding." All of the above points, and still others that might be named, will stand as a credit or discredit to the designer.

10. **The Heating Engineer and the Contractor.**—In installations calling for a large expenditure of money, the heating engineer is usually called in to draw up the plans and specifications, and the contract for purchasing and installing the same is usually given to a separate party. This has the advantage of obtaining the complete layout of the plant with the apparatus specified by a party who is in a position to give an unbiased opinion, and also the advantage of obtaining a low estimate on installation because of the competitive bids. This system seems to be a very satsifactory one, all things considered, and probably gives the best results to the purchaser. It is not, however, entirely free from abuses. It is assumed that the party retained to do the engineering work will do his work conscientiously and scientifically, and that when done each part will correlate to the other parts and all will work in harmony and without loss of efficiency. This means that the designer himself should understand his subject and should be able at any time to give facts and figures on every part of the work. He should also have his plans and specifications complete in all parts and stated in plain and definite language, so that the contractor will understand every part and not be compelled to assume conditions which in the end may be erroneous. No uncertainty should enter into any part of the contractor's work, either as to quality and make of materials, or as to the way in which such materials are to be installed. Of course, there are many features of the work which may be left open to the discretion of the contractor, and these should not be arbitrarily stated. Such parts as the smaller details of the piping system, for example, where the cutting of the various parts may not in the least affect the efficiency of the plant, and where purposely omitting the same in the specifications and plans will give some latitude and satisfaction to the contractor in his work. These and other minor points are best not specified. The great trouble, however, with plans and specifications is not as to their exactness even to every little unnecessary detail, but as to the **lack of exactness concerning important points.** When the contractor may reasonably make more than one interpretation of any certain part, it is naturally to his interest to take such view of the case as will carry out the letter of the contract at the least possible expense. This may not be to the best interest of the purchaser, but such procedure should not be wholly charged to the contractor.

11. The final word of caution that this paper wishes to extend probably does not apply to any member of this organization, but it does apply in many cases to men in like occupations with yourself. The keynote is struck in the preceding paragraph and may be paraphrased in the following: "The engineer attacking any important problem should first become thoroughly familiar with the principles involved in its solution, and should afterwards check his results wherever possible." This point was emphasized to the writer in a test recently run upon a heating and ventilating plant in a certain building used for auditorium purposes. The trouble in this plant seemed to be not the one usually found—i. e., cutting of parts to a minimum size and capacity—but rather the reverse will be seen by only one item out of a number which might be used for the benefit of illustration. The auditorium, which was exposed on two sides, contained 225,692 cubic feet of volume, and was designed to accommodate 1,350 persons, thus requiring, we will say, a total of 2,430,000 cubic feet of fresh air per hour. Allowing the outside temperature to be zero and the temperature of the auditorium air to be 65 degrees F., the total heat loss,

including that thrown away with the air, was found to be by calculation 3,072,875 B. T. U. per hour, which gave by calculation 2,375 square feet, or 7,125 lineal feet, of one-inch coil surface in the indirect heater. When the coil surface was measured after the test, it was found to contain 14,612 lineal feet, or a little more than twice the calculated amount. One reason for the test was the fact that a large part of the coil surface had been shut off soon after installation and never used afterward, and it was supposed that the system was not well proportioned. Other parts of the plant also seem to show the same lack of rational design.

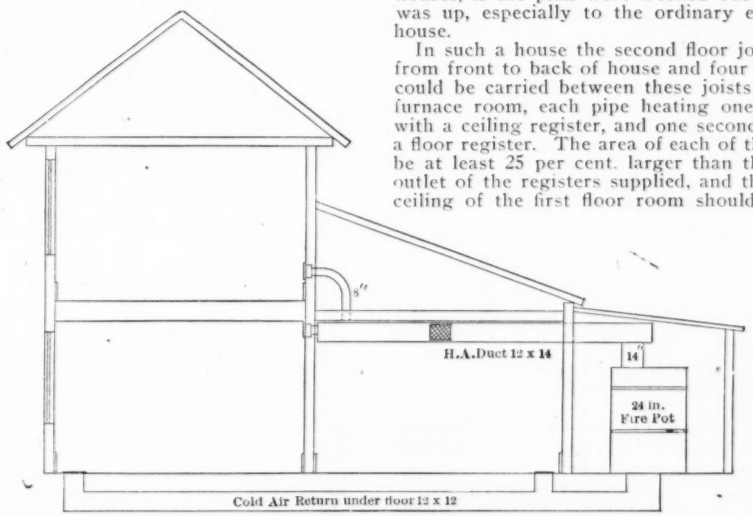
12. What has just been stated concerning this one plant is true of too many plants about the country. If the business we represent is to rank high among other lines of engineering work, it is the duty of every man to discourage such methods and insist upon a higher standard.

This was discussed by **Frank K. Chew, George D. Hoffman, James H. Davis, Joseph A. Gorton, C. E. Oldacre and Wm. M. Mackay.**

A paper was then read on **"A Hot Air Furnace in a House without a Cellar," by R. S. Thompson,** of Springfield, O. In the absence of the author the paper was read by Mr. Chew, as follows:

A Hot Air Furnace in a House Without a Cellar.

Some time since I was asked if I could put a furnace in a house where there was no cellar, and where, on account of local conditions, a cellar was impossible.



I replied that it **could** be done, and I submit herewith a sketch showing how it **was** done.

The house had six rooms, four in first story and two in second, the rear being only one story high. As the two halves of the house were much alike, a sectional view of one side shows practically the whole. The dimensions of the rooms are given on the plans.

I had the owner build a small shed room in the rear, so that it extended across both the back rooms, or rather part of each room, as shown in the first floor plan. In this the furnace was set opposite the central partition, so that one-half the furnace was back of each room.

A rectangular pipe 12x14, made of galvanized iron, was placed under ceiling of rear room, against inside wall, and carried through wall into furnace room over furnace, with which it was connected by a 14-inch upright round pipe.

A register in the side of this rectangular pipe, as shown in the elevation, heated the room through which it passed. Close to the ceiling in the front rooms wall registers were connected with the end of the rectangular pipe. An 8-inch round pipe was tapped into the top of the rectangular pipe near the front of the room, carried through the loft and into a register in wall of front upper room above baseboard, as shown.

The two lower and the upper room on the other end of the house were handled in practically the same manner. There were thus two 14-inch pipes taken off top of furnace to heat these six rooms, the two having an aggregate area but little greater than that of six 8-inch pipes. But I have found that one 14-inch pipe will carry more air than three 9-inch pipes, and a pipe rising perpendicularly off the top of a furnace will carry much more air than a horizontal one.

Of course this put an exposed square pipe in each of the back rooms, but as it was against ceiling and wall it could easily be incased, and did not materially mar the appearance of the rooms.

The elevation and plan was originally laid out as shown for return air ducts under the floor, connected with cold air registers in the four lower rooms and with the furnace. Owing to some changes in plan, these have never been put in, and as the system is working to the delight of the owner, it is probable they will not be, though it is certain they would greatly improve the working of the system.

This particular job was a makeshift, adapted to existing conditions, and put in an old house which would not warrant expensive changes in the building; but anyone can see how easily this could be adapted to other houses, if the plan were worked out before the frame was up, especially to the ordinary eight-room square house.

In such a house the second floor joists could be laid from front to back of house and four rectangular pipes could be carried between these joists and out into the furnace room, each pipe heating one first floor room with a ceiling register, and one second floor room with a floor register. The area of each of these ducts should be at least 25 per cent. larger than the combined free outlet of the registers supplied, and the register at the ceiling of the first floor room should be much larger than the register in the floor of the second floor room above it.

Ducts for the return of the air to the furnace could be carried between the joists of the first floor rooms with a cold air register in the floor of each of these rooms near an outside wall, and I should consider this a very important feature of the system. In my judgment the combined area of these return ducts should be at least 90 per cent of that of the hot air ducts.

A little mechanical common sense will suggest modifications which will make this plan applicable to houses of other sizes and other construction. The important point is that the plan would have to be worked out before the construction of the house was commenced, and the carpenters would have to accommodate their work to it.

This system has several advantages.

There is no running down into a dark cellar to attend to a furnace. The floor of the furnace room can be on a level with the floor of the house, or not more

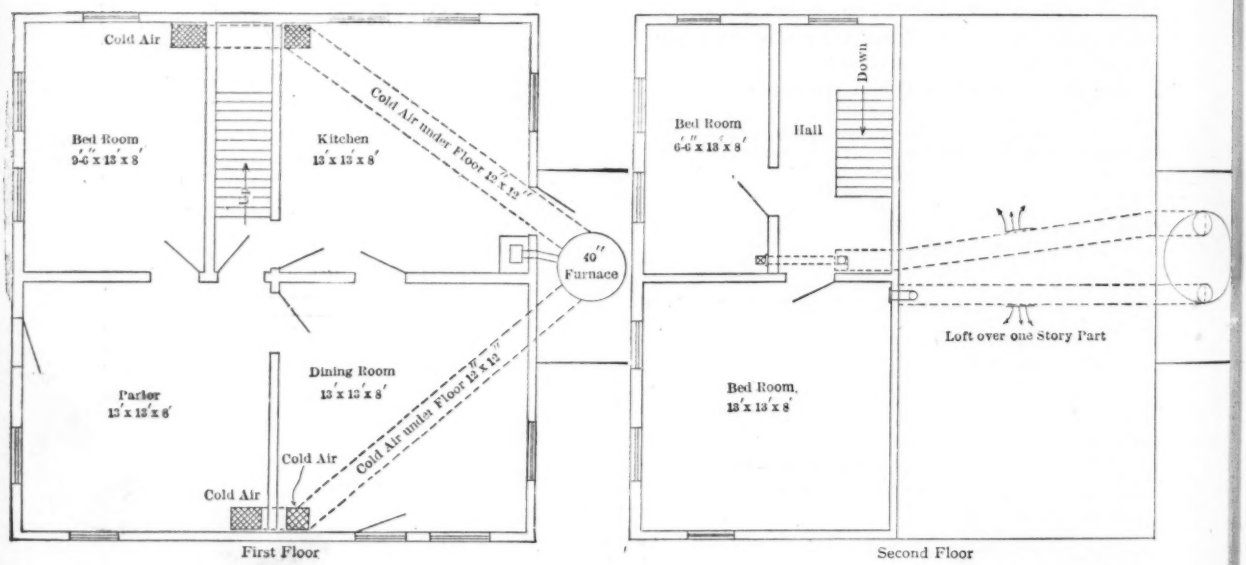
than one or two steps down. It should, of course, be made of concrete.

The walls could be of brick, or frame, covered with galvanized iron. The top of the furnace would be so far below the roof that there would be no danger from overhead heat. It would undoubtedly be safer from fire than the usual plan.

There could be abundance of light, and consequently this furnace room could be kept much cleaner than the average furnace cellar is kept.

If the furnace were one with large "thoroughfare" (clear space inside the casing) and air ducts, both flow and return were of ample size, air could be used at a comparatively low temperature, which would improve the air in the house and prolong the life of the furnace.

While there are other reasons which make it improbable that this plan will be adopted to any considerable extent where cellars are possible, yet there are some localities where cellars are impossible, and in nearly every locality there are some houses where a cellar is impossible, and this plan may therefore extend the usefulness of the hot air furnace.



A furnace with a 24-inch firepot was used, because a second-hand furnace was available, and not because so large a furnace was necessary, as it had previously been used with satisfaction in a house of ten rooms.

The paper was discussed by **David Miller, A. O. Jones, Frank K. Chew.** Mr. Miller and Mr. Jones coincided in the statement that galvanized iron pipe should not be used for conveying heat, as it radiates too much heat in the cellar. **C. B. Thompson,** of Buffalo, did not agree with the statement, and **James H. Davis** called attention to the fact that all blower installations were made with galvanized iron pipe. Mr. Jones said 99 per cent of the installers of furnaces used tin, and asked if blower ducts were not made of galvanized iron because they were so large. **Mr. Oldacre** said results for conveying air were equally good with galvanized iron as with tin pipe, and he believed the reason for using tin was in 99 per cent of tin shops there were no tools with which to work galvanized iron. **Professor Hoffman** called attention to the fact that transmission of heat was not an important factor, as all cellar pipes should be covered; he thought the tin pipe was smoother in its finish than galvanized iron and all advantage should be given the passage of air. W. H. Johnson could not see how the job described in the paper could work at all.

Rules for Furnace Heating.

Mr. Chew said on this topic for discussion that there should be a statement made that there were rules for heating with hot air. **Professor Hoffman** said that every factor entering into hot air heating could be calculated, and that there were rules governing every phase of the work.

Forced vs. Gravity Circulation.

The third topic for discussion, on the comparative value of forced and gravity circulation in residence hot water heating system, brought out a diagram of a system observed by **J. A. Donnelly,** in which there was 115° difference between the water at the boiler and at the return, still having what Mr. Donnelly thought was very slow circulation. He thought a sufficient velocity in circulation could be obtained with 20° difference in temperature, still keeping pipe sizes commercially possible. **W. M. Mackay** said he had better results with natural circulation than with forced circulation; that any device for raising the temperature of the water would also raise the temperature of the escaping gases. **Professor Hoffman** said the transmission of heat from the coal to the water is due entirely to the difference of temperature between the heat of fire and the heat of the water, consequently increasing the temperature of the water means a corresponding increase in the temperature of the fire, therefore a higher temperature of stack gases.

The morning session then adjourned.

Friday Afternoon.

After the ladies had been sent away on an automobile ride, and Mr. Bennett had made some announce-

ments as to the entertainment provided by the Niagara Falls Bureau of Publicity, **John F. Hale,** secretary **of the Illinois Chapter,** read a report of the proceedings of the Chapter since the last report, detailing the meetings held, with brief resumés of papers read, etc.

School Heating and Ventilation.

A paper bearing the title "Simplifying the Installation and operation of School Heating and Ventilating Apparatus," by **S. R. Lewis,** of Chicago, was read—in the absence of its author—by **E. F. Capron,** of Chicago. The paper follows:

Simplifying the Installation and Operation of School Heating and Ventilating Apparatus.

If there is any such thing as a standard type of heating and ventilating apparatus for school buildings in this country, perhaps the plant shown in the accompanying plan and marked No. 1 may be described as standard.

The boilers are of the ordinary horizontal return tubular type, and are operated at comparatively high pressure. The fan is engine-driven, and the exhaust steam from the engine is used in the heating system. The customary pressure-reducing valve, back pressure valve, grease extractor, etc., are installed. The water of condensation is returned to the boilers by an automatic pump and receiver. The air is tempered for cooling the building by approximately one-third of the heating coils prior to admission to the fan, and heated for warming the building by approximately two-thirds of the heating coils set in the fan outlet. This system, when carefully designed and intelligently operated, is probably more economical in operation than any other. If, however, for any reason the fan cannot be operated, the warm air will all go to the nearest and warmest rooms, and those with the greatest exposure and longest horizontal ducts suffer. This possibility has led in many instances to the installation of direct radiation as an auxiliary to the fan system.

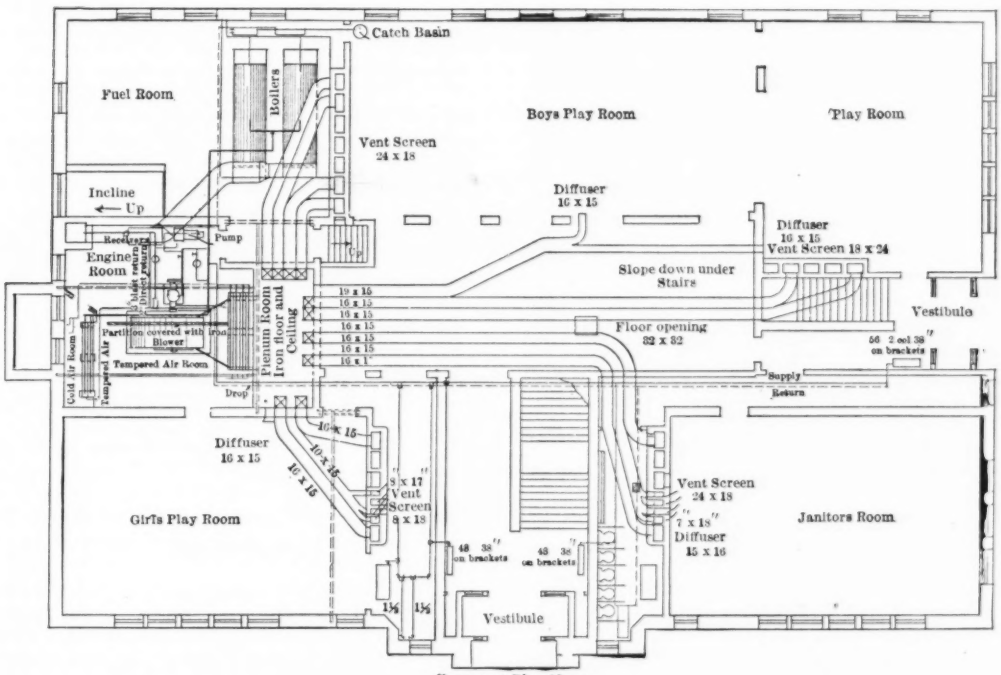
If there is not a separate duct and mixing damper for every room, enough direct radiation must be installed in each room to heat the same independent of the fan, else the temperature of the building cannot be controlled. This leads to a heavy first cost, for practically two plants, the ventilating system costing very nearly as much as an all-blast system, the direct radiation being additional.

This plan is also subject to the following objections:

The direct radiation is constantly pumping foul air and dirt from the floor and mixing it with the fresh air at the ceiling.

The direct radiation causes local overheating and occupies valuable space in the rooms.

Well-authenticated records show that the combination plants above described are considerably more expensive in fuel than the all-blast plants, and it is evident that they must require more attention and repairs.



Basement Plan No. 1

The above reflections led to the development and installation of a number of plants of the type shown on plan No. 2, which seem to overcome the main objections to both of the previously described systems.

This type is subject to many modifications, and I do not claim that it should receive consideration over the old types in every instance. I know, however, that for many installations it will give superior results. There is nothing especially original about it, it being merely an adaptation. It is easy in many instances so to locate the flues that it can be economically installed.

The boilers are set so that the difference in level between the base of the blast coils and the boiler waterline is about thirty inches. The coils are located in small plenum chambers at the bases of the flues. There is practically no direct radiation. The fan is motor driven. The steam pressure may be anywhere from 0 to 20 pounds, or higher. The circulation is entirely by gravity. The air is tempered for cooling the rooms by double dampers in the plenum chamber decks.

When the fan is stopped the rooms get a good flow of air by gravity, and are heated almost as efficiently

as by direct radiation, while securing considerable ventilation. If any gravity furnace plant will heat, this steam plant will do so by gravity. The steam-fitting is a trifle more expensive than with the first type, but infinitely less expensive than with auxiliary direct radiation. In many buildings this apparatus may be laid out with better economy of space than with any other type. It retains the advantages of the older apparatus and eliminates the faults without incurring the disadvantages of the still older type of blast plant in which the indirect radiation for each room is located in the flue leading to that room.

In engine-driven plants the layout is the same, care being taken that when the engine is not running the pump may be by-passed and the blast coils circulated by gravity. To this end, of course, a low water-line boiler and shallow blast coils must be used.

The steam piping must be generously proportioned, so as not to have undue false water-line. Tests with a water glass on the return drop from a blast coil 75 feet from the boilers indicated that when the fan started, blowing air at 8 degrees below zero, the water stood about 26 inches above the boiler water-line, but soon settled down and remained constant at about 18 inches above the boiler water-line.

Wherein this plant fails to deliver results equal to the older types is not yet evident to me after two winters' experience and observation of several installations.

Furnaces With Fans.

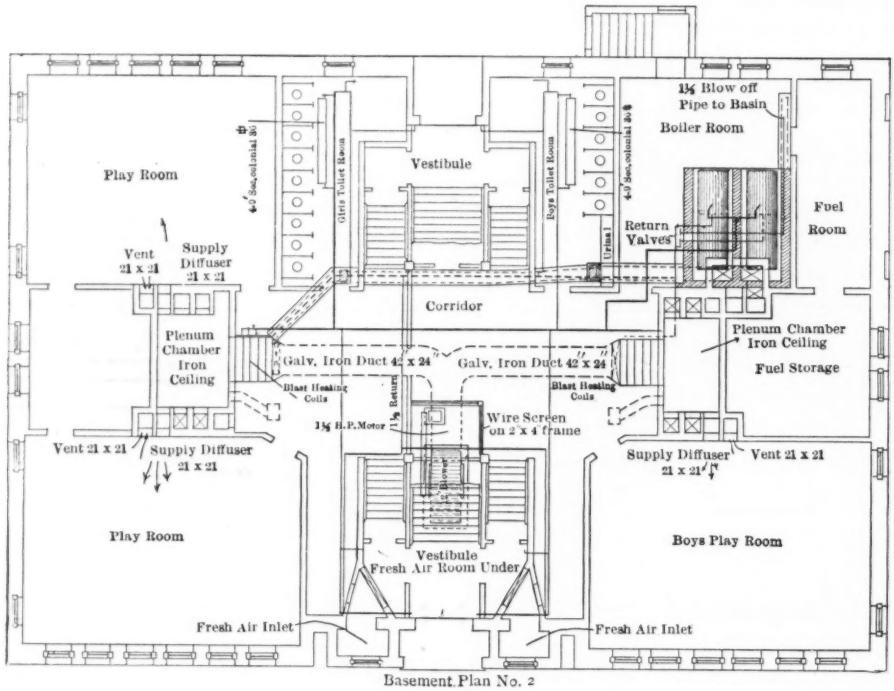
There will probably always be a large number of school buildings heated with furnace apparatus. Anything like the same engineering skill and research as have been devoted to steam heating extended along this line would have given it a far better reputation today than it holds. The general availability of electric power, and the compulsory ventilation requirements, have given fan furnace heating a great impetus. The following seems to me prime considerations:

There is almost no furnace well adapted to any one fuel which is of much account for any other fuel.

Radiant heat does not warm very much air, and the heat from a furnace is largely radiant heat, which rises in great quantities directly upward from the fire. The most efficient furnaces will be found to have great weight of metal suspended above the dome, so arranged as to absorb the heat and transmit it by contact with the rising air currents.

Because of the high air temperature possible, many furnace plants have been made to worry along with disc fans of inadequate size and poorly proportioned ducts. The same size and type of fans and ducts should be used interchangeably for blast steam or blast furnace apparatus, if adequate results are to be obtained.

Blast steam plants have valves for control so that one or more sections of the heating coils may be cut out as the weather conditions permit. With adequate fan capacity, speed regulation, and properly arranged compressor dampers above the furnaces, which are grouped, one or more may be cut out and not fired—sufficient air for ventilation being forced at an increased velocity through the casings of those in use.



Basement Plan No. 2

Blast steam plants are almost universally equipped with automatic regulation. Blast furnace plants may be controlled with equal facility and tempered air be secured for cooling the rooms without difficulty by using dampers in the plenum chamber decks.

For hard coal great fire-box capacity and shaking and dumping grates are imperative. Apparently the weight of the furnace is not as vital as its coal storage capacity.

For soft coal, however, the furnace must have great weight of metal to store to some extent the heat from the quickly flashing combustible, and to prevent the rapid changes in temperature of the building in effect when soft coal is burned in a light weight furnace.

All furnace fan systems in large buildings are subject to the objections to steam plan No. 1 previously described. It is doubtful if adequate furnace fan systems can be installed more economically than equal steam systems in buildings containing over twelve class

rooms. For smaller buildings the horizontal pipes are usually not so long, but that some gravity circulation is in effect when the fans are not running. The toilet rooms may profitably be protected from freezing by very small auxiliary direct hot water or steam plants, the fires in which are never permitted to go out in freezing weather.

Fan furnace plants along the lines herein outlined will give very good results as to efficiency and economy. Very many of these heating systems will be installed. I ask for them more study and engineering skill than they have had in the past. The field for improvement is almost unexplored.

The internal combustion engine is rapidly supplanting the steam engine. It may well be that we will see the day when the direct acting air heater shall supplant the steam boiler and coils.

I have attempted briefly to describe the simplest steam plant, with its nearest parallel, the most complicated furnace plant.

Apparently they are growing nearer together, and we may hope that the best apparatus of the future will combine the merits of the two types without any of their faults.

In the discussion **Mr. Weinshank** took exception of the term "standard" as applied to plan number one. Mr. Donnelly observed that "standards" were like political faiths, subject to fluctuations. **Mr. Dugger** told how the indirect system was formerly supplemented by direct coils. Mr. Hale observed that plan number two would cost less than number one. **Mr. Davis** pointed out to a still further reduction in cost by doing away with complicated apparatus and—in many cases—with a licensed engineer. **Mr. Johnson** told of the installation of fans in furnace heating. He had made a comparison of hot air and steam heating systems and found the fuel consumption was less in the hot air system. The only reason, however, why furnaces were used, is because they are cheaper. Mr. Weinshank said Mr. Lewis' hope "that the best apparatus of the future will combine the merits of the two types without any of their faults," was hoping against hope, as furnaces would never supplant steam plants. Mr. Johnson pointed out that on the Pacific coast the hot air blast system was universally used. Mr. Davis corrected Mr. Johnson by saying that steam blast systems are being installed in San Francisco, Oakland and Portland. Mr. Miller knew of several blast furnace plants where fuel consumption was at least 25% less than with steam plants. **Mr. Kauffman** stoutly excepted to the belief that furnace heating plants were cheaper to maintain than steam. **Mr. Donnelly** said the furnace was adapted to a moderate sized building and had a field which would always create a demand for the furnace, but it was not—generally speaking—adapted to heating public buildings, and it would not work as well as a steam plant. **Mr. W. M. Mackay** pointed out that at the time the Massachusetts law went into effect the only installation in the state which met the requirements of the law was a furnace heated building in Charlestown. **Professor Hoffman** said the heat loss from a building was the same in either system. The comparison must also cover the fact whether ventilation-air was heated or not; if so, more fuel would be used. With first-class apparatus, properly installed, the consumption of coal by either system ought to be the same in the same building. Mr. Kauffman suggested the appointment of a committee to determine the consumption of fuel in steam and hot air systems.

Cast Iron Heaters for Hot Blast Work.

A paper bearing the title, "Cast Iron Heaters for Hot-Blast Work," was read by **Theodore Weinshank,** of Indianapolis. It here follows:

The heater referred to in this paper is made of sections having cored diamond-shaped projections on each side, as shown in Fig. 1 and cut section Fig. 2. The flat sides of the section are braced at intervals, so that the metal may be thin and yet the section be strong. It will be seen that the metal is of uniform thickness, hence all parts are equally effective in condensing steam. The shape of the projections is such that while offering a minimum resistance to the flow of the air, it insures that the stream of air passing over the surface of the section shall be thoroughly broken up and all the air made to come in direct contact with some part of the metal of the section. The sections are fastened together in groups by screw nipples at top and bottom. The length of the nipple determines the amount of free area in the heater. A large free area means a low resistance to the passage of the air at a given velocity through a group of sections, and a low rise of temperature of the air; while a small free area means a high resistance to the passage of the air at a given velocity, and a high rise of temperature of the air. As a heater is made up of groups of sections placed one behind the other, it is evident that if we have a low rise of temperature of

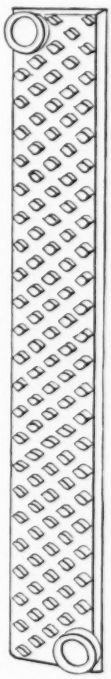


Fig. 1.

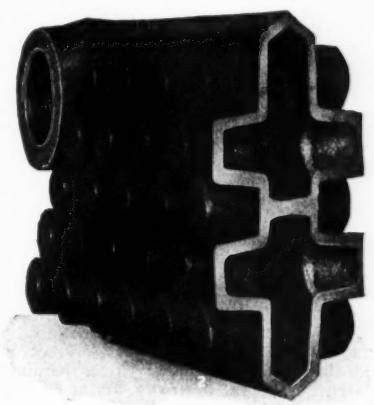


Fig. 2.

the air per group of sections we must have a heater of greater depth than would be necessary where the temperature rise of the air is greater. That is to say, a long nipple means a wide and a deep heater. The nipple finally adopted in this type gives approximately 50 per cent free area, and has proven by experience to give a good temperature rise to the air, as shown on table 1.

In developing this section the manufacturers built a testing plant for the purpose of testing and perfecting their product and to get such information as would be needed in designing a hot-blast system of heating. It was because of the numerous problems that came up while making the first series of tests that prompts the writer to submit this paper. The manufacturers installed a testing plant; the building, having large doors and windows, by the opening or closing of which it was possible to regulate the temperature inside so as to keep it nearly constant during a test,

and an attempt was made to have the temperature the same for all the tests. The apparatus in the building consisted of a 110-inch single inlet, top horizontal discharge fan arranged to draw air through a sheet-iron casing in which the sections were arranged as desired for different tests. The fan was driven by a 10-horsepower belted motor at a constant speed of 231 revolutions per minute for all the tests. The outlet of the fan was arranged so that air could be discharged into the building or to the outside, or to both as desired; but during most of the tests that the writer observed the air was discharged into the building.

TABLE 1.

RISE OF TEMPERATURE, K, PER DEGREE DIFFERENCE BETWEEN TEMPERATURE OF STEAM AND MEAN TEMPERATURE OF AIR FOR DIFFERENT VELOCITIES OF AIR. VOLUME OF AIR MEASURED AT 70 DEGREES.

Velocity, feet per minute.	Number of sections heater is deep.					
	1	2	3	4	5	6
1600	0.124	0.253	0.395	0.527	0.649	0.761
1500	0.132	0.261	0.403	0.535	0.657	0.769
1400	0.139	0.268	0.410	0.542	0.664	0.776
1300	0.147	0.276	0.418	0.550	0.672	0.784
1200	0.154	0.283	0.425	0.557	0.679	0.791
1100	0.162	0.291	0.433	0.565	0.687	0.799
1000	0.170	0.299	0.441	0.573	0.695	0.807
900	0.177	0.306	0.448	0.580	0.702	0.814
800	0.185	0.314	0.456	0.588	0.710	0.822

s = number of sections heater is deep.
v = velocity of air in feet per minute.

$$k = 0.185 - \frac{0.061(v-800)}{800}, \text{ where } s=1.$$

$$k = s(0.167 - 0.005s) - \frac{0.061(v-800)}{800}, \text{ when } s = 2 \text{ or more.}$$

The outlet of the fan was boarded up until the opening through which the air was discharged was about 21 to 38 inches. It was found that with this size of outlet the velocity of the air passing from the fan was nearly constant at all points of the outlet. For an opening larger than this, it was found that the velocities varied at different points of the outlet to such an extent that it was difficult to determine the actual velocity of the air leaving the fan. The amount of air that the fan handled per minute was varied by reducing the size of the outlet. The velocity of the air was not quite constant at the outlet of the fan for smaller areas of the outlet, but it was nearly so. The velocity was also affected somewhat by the number of sections in depth of the heater being tested. The volume of air passing through the heater was determined by multiplying the area of the outlet in square feet by the velocity in feet per minute of the air passing through the outlet, as determined by means of an anemometer. The readings of the anemometer gave concordant results. The temperature of the air as it left the outlet was taken, and this volume reduced to an "equivalent volume at 70 degrees"—that is to say, air at 70 degrees was taken as the standard, and all tests were made upon this basis.

The velocity of the air passing through the heater was obtained by dividing the volume of air passing per minute, when reduced to 70 degrees, by the free area of the heater; and in the following tests the free area of the heater was, in all cases, 9.21 square feet.

The heater was arranged in six groups, each group being ten sections wide and one section deep, and containing 170 square feet of heater surface. The sheet-iron casing for the heaters was arranged so that as many groups as desired could be used, and tests were made with from one to six groups in use. Groups not in use were removed from the casing, so as to leave only those groups actually in use in the casing. Steam was supplied through a 3-inch main leading from an adjoining building through a Kieley special reducing pressure valve to a 5-inch main, to which each of the groups of the heater was connected by the flanged nipple. A thermometer was calibrated and placed in the low pressure main, and readings taken from it gave the temperature of the steam in the water. Steam was supplied to the top of each group, and the water of condensation was drawn off from the bottom at the opposite end of the group.

The air drawn through the heaters was in all cases taken from outside of the building through a door which was of the same size as the casing of the heater. The bottom of this door was about seven feet from the ground, and the outside or initial temperature of the air was measured about four and one-half feet above the ground directly below this door.

According to the report of these tests, one of the first problems that the experimenters had to deal with, was the determination of where the final temperature should be measured. The first group of sections was placed about four and one-half feet from the inlet of the fan, and an attempt was made to measure the temperature of the air in this space between the fan inlet and the first group of sections. A thermometer was hung in this space and its temperature was more than had been anticipated. This thermometer indicated a higher temperature. Then a screen was placed between the group of heater sections and the thermometer so as to reduce the effect of direct radiation from the first group. Various sizes and forms of screen were used, but it was found impossible to avoid to some degree the effect of the direct radiation, and hence it was not considered proper to take the reading of a thermometer placed between the fan inlet and the first group of sections as the final temperature of the air. A thermometer was then put just inside the fan casing near the outlet, and readings from it were taken. The readings of this thermometer were usually several degrees lower than the readings of the thermometer between the first group of sections and the fan inlet. The difference between the readings of the two thermometers was greater when more than one group of sections were in use than when only one group was being used: and it was somewhat more different for low velocities through the heater than it was for high velocities. The report shows that the experimenters finally determined that the reading of the thermometer at the fan outlet should be taken as the final temperature of the air. This means, of course, that the rise of temperature of the air during its passage through the heater was equal to the difference between the temperature as indicated by the

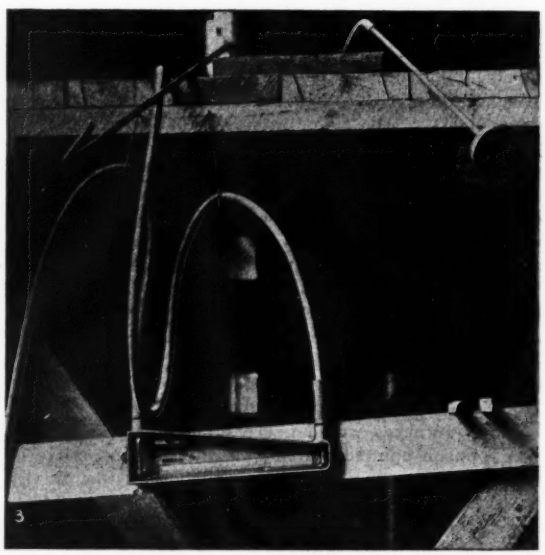


Fig. 3

thermometer at the outlet of the fan and that indicated by the thermometer hung outside of the building.

It is a question that I bring before this Society for discussion, as to whether the temperature indicated by the thermometer between the fan inlet and the first group of sections should not have been taken as the final temperature of the air? It is evident, of course, that during the passage of the air through the fan there was some loss of heat and some cooling of the air. How much this amounted to it is impossible to say. Attention was directed principally to determine the rise of temperature of the air for various velocities through the heater. It is evident that this course was pursued because if the rise of temperature of the air while passing through the heater is taken as the measure of the efficiency for heating power of the heater, it would enable the makers of the sections to sell them on a guarantee, the fulfillment of which could be easily determined by hanging two thermometers in such position as to indicate the initial and final temperature of the air passing through the heater.

The next problem was to determine the volume of air passing through the heater per minute. Here considerable difficulty was encountered, and it was finally decided that, as stated before in this paper, the velocity of the outlet should be determined by means of an anemometer. Several readings were taken at the outlet during each test, and the average of these readings was taken as the velocity of the air passing through the outlet during the test. Three different sized outlets were used as a rule, although in some subsidiary tests a fourth size was used. It was found that for a given size of outlet the velocity was nearly constant for any number of groups of sections in the heater. The largest outlet used was 21 by 38 inches, the next was 18 by 38, the next 15 by 38, and the next 12 by 38. The smallest opening was not used very much.

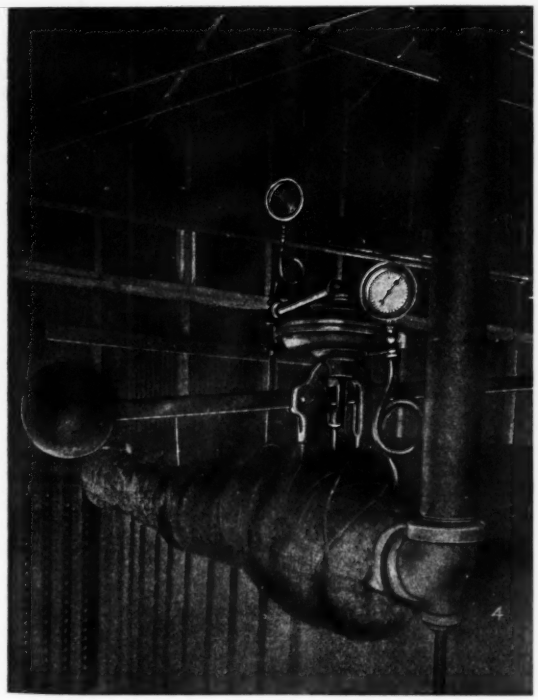


Fig. 4.

In measuring the velocity of the air passing through the outlet one anemometer was checked against another anemometer for accuracy. An attempt was made to determine the velocity by means of a Pittot tube, such as is shown in Fig. 3. The Pittot tube is shown in the upper left-hand corner of this figure, and an apparatus for indicating the static pressure is shown in the upper right-hand corner of the figure. This apparatus consisted of two metal disks, each about three inches in diameter, having between them a third disk about six inches in diameter, made of ordinary wire screening such as is used for windows. To the center of one of the metal disks was screwed a rod, and from this rod a rubber tube led to a leg of a draft gage. The other leg of the draft gage was connected to the Pittot tube. The result of this arrangement was that the reading of the draft gage showed at once the pressure or head producing the velocity of the flow of air at the outlet. The head fluctuated so widely for slight changes in position of the tube in the outlet that the results of these readings could not be used with any degree of satisfaction.

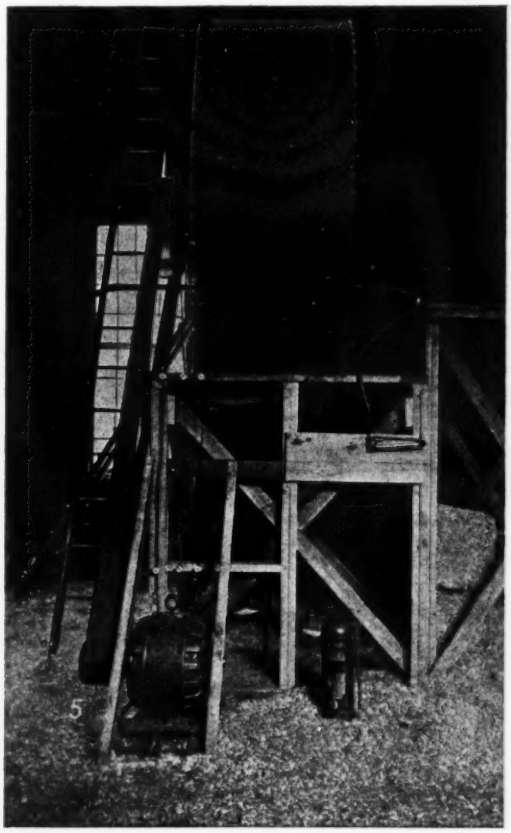


Fig. 5.

Fig. 4 shows the reducing pressure valve and the thermometer in the steam pipe. The reading of this thermometer was taken as the temperature of steam in the pipe. Gages were used simply as checks. During the entire series of tests, when the reducing pressure valve was once set, it was seldom that the temperature varied more than one degree.

Another problem that required solution was how to determine the frictional resistance to the flow of air

through the heater at different velocities. This required some means for determining the loss in pressure due to the resistance of the heaters as the air passed from the outside through them to the fan. This was finally determined by means of a static pressure gatherer attached to a tube that was in turn attached to a draft gage. This gatherer was similar to the one used in connection with the Pittot tube, was arranged so that it magnified ten times—in other words, a difference of reading of one inch meant a difference in pressure of 0.1 of an inch. The gatherer itself was placed between the fan and the first group of sections, as shown in Fig. 5.

The results of the tests were very uniform for similar conditions. After the apparatus had been started and run until normal conditions had been reached, it was found that from this time on, as long as the conditions remained the same, there was practically no change in the working of the apparatus. A rise of one degree in the outside temperature was followed at once by a rise of one degree in the final temperature of the air. The motor maintained a uniform speed, and hence the fan discharged a uniform volume of air through the outlet; this meant a uniform velocity of the air through the groups being tested, and was checked by the draft gage, which showed that the frictional resistance of the heaters was constant.

It is evident that if the frictional resistance is constant for a given velocity of air through a heater composed of a given number of sections in depth, and if we can determine what this resistance is, we have at

TABLE 2.

HEAT UNITS TRANSMITTED PER SQUARE FOOT OF HEATING SURFACE PER HOUR PER DEGREE DIFFERENCE BETWEEN THE TEMPERATURE OF THE STEAM AND THE MEAN TEMPERATURE OF THE AIR.

Velocity, feet per minute.	Number of sections heater is deep.					
	1	2	3	4	5	6
1600	11.94	12.17	12.67	12.67	12.80	12.20
1500	11.91	11.76	12.11	12.05	11.88	11.56
1400	11.70	11.28	11.50	11.41	11.18	10.89
1300	11.50	10.79	10.89	10.75	10.51	10.22
1200	11.11	10.21	10.22	10.05	9.81	9.52
1100	10.72	9.63	9.55	9.34	9.09	8.82
1000	10.23	8.99	8.84	8.61	8.36	8.10
900	9.59	8.28	8.08	7.85	7.60	7.35
800	8.90	7.56	7.31	7.08	6.48	6.60

once a means by which we may determine how much air is passing through a given heater. This is found by determining the resistance to the passage of the air, expressed in inches of water, and then turning to a table prepared from a standard heater giving the velocity of the air through a heater of the same number of sections in depth, read off the volume of air passing per minute.

If the scheme suggested in the report of these tests be carried out to this extent, it is evident that when such cast-iron sections are installed in a plant under a guarantee to raise the temperature of the air through a given number of degrees that it becomes a very easy matter for anyone to make a test of the plant. All that would be necessary would be to put in a draft apparatus and obtain the velocity of the air passing through the heater, and then to put in two thermometers by which the initial and final temperatures of the air would be determined. Knowing the velocity of the air through the heater, and knowing the free area of the heater, the product would be the volume of air passing through the heater per minute. So that from readings of two thermometers, and the reading of a single draft gage, we will be able to determine how many cubic feet of air was being handled per minute and through what rise of temperature this air was being heated. This, in my mind, would present a great advantage in favor of the use of these heater sections, in addition to the other advantages which they may have. And this great advantage is due to the fact that the heating effect of the sections is uniform and the resistance to the flow of air through a heater made of these sections is also uniform for a given velocity.

Table 1 gives the rise of temperature per degree difference between the temperature of the steam and the mean temperature of the air for different velocities of air.

Table 2 gives the heat units transmitted per square foot of heating surface per hour per degree difference between the temperature of the steam and the mean temperature of the air.

TABLE 3.

FINAL TEMPERATURE, T, OF AIR WHEN ENTERING HEATER AT 0 DEGREES. TEMPERATURE OF STEAM IN HEATER, 227 DEGREES. VOLUME OF AIR MEASURED AT 70 DEGREES.

Velocity, feet per minute.	Number of sections heater is deep.					
	1	2	3	4	5	6
1600	26.5	51.0	74.9	94.7	111.3	125.2
1500	28.1	52.4	76.3	95.8	112.4	126.0
1400	29.5	53.8	77.2	76.7	113.3	126.8
1300	31.1	55.0	77.6	97.9	114.3	127.7
1200	32.4	56.4	79.6	99.0	115.3	128.7
1100	34.0	57.7	80.5	100.0	116.2	129.6
1000	35.6	59.1	82.0	100.1	117.2	130.5
900	36.9	60.1	83.0	102.1	118.0	131.3
800	38.5	61.6	84.3	103.1	119.0	132.3

t = final temperature of the air which enters at 0 degrees.
k = rise per degree difference between the temperature of the steam and the mean temperature of the air.

$$t = \frac{454\,k}{2 + k}$$

Take 3 shows the final temperature of air entering in the heater at a temperature of zero degrees when the temperature of the steam in the heater is 227 degrees, corresponding to a pressure of steam of five pounds by the gage.

Table 4 shows the friction loss, or resistance to the flow of air through a heater made of these sections, for different velocities of air in feet per minute.

In all of these tables the volume of the air is measured at 70 degrees, and the velocity of the air passing through the heater is obtained by dividing the volume measured at 70 degrees by the free area of the heater.

It is to be hoped that this short statement of some of the problems encountered in making tests on the cast iron heaters to which I have referred in this paper will be of value to others, and will bring from those who have already made tests some expression of opinion or some statement as to how they have met and solved these same problems. The results which have been given in the tables are not so much in themselves as they point to the results that ought to be obtained under good conditions.

TABLE 4.

FRICTION LOSS IN INCHES OF WATER DUE TO THE SECTIONS. VOLUME OF AIR MEASURED AT 70 DEGREES.

Velocity, feet per minute.	Number of sections heater is deep.					
	1	2	3	4	5	6
1600	0.236	0.288	0.416	0.543	0.672	0.800
1500	0.207	0.253	0.366	0.477	0.590	0.703
1400	0.180	0.220	0.318	0.415	0.514	0.613
1300	0.156	0.190	0.274	0.358	0.443	0.528
1200	0.133	0.162	0.234	0.306	0.378	0.450
1100	0.111	0.136	0.197	0.257	0.318	0.378
1000	0.092	0.112	0.162	0.212	0.262	0.312
900	0.074	0.091	0.132	0.172	0.212	0.253
800	0.059	0.072	0.104	0.136	0.167	0.200

f = friction loss in inches of water.
v = velocity in feet per minute.
s = number of sections heater is deep.

$$f = 1.47\left(\frac{v}{4{,}000}\right)^2, \text{ where } s = 1.$$

$$f = (0.8s + 0.2)\left(\frac{v}{4{,}000}\right)^2, \text{ where } s = 2 \text{ or more.}$$

If this paper will bring out a full discussion of the problems encountered in the use of cast-iron heaters, it will have served its purpose, and the author will feel that his efforts have not been in vain.

In conclusion, I take pleasure to thank Prof. J. H. Kinealy for considerable data gathered during the tests; also Professor Kent for a number of suggestions while the tests were being made.

I did not attempt to plot results. I leave it to investigators to check the results and plot curves from formulæ given at the bottom of each table.

The paper was discussed by aid of a diagram placed on the board. The points most interesting were: Location of thermometers; throttling the delivery of the fan; determination of static pressure; velocity of the flow, etc. **Mr. Bramer** made a sketch showing a better way to throttle a fan's delivery by a damper; methods of obtaining static pressure, velocity of flow, etc. **Professor Hoffman** did not approve the use of the Pittot tube, as results of its use by him had been unsatisfactory. Mr. Weinshank found the difference between the cast iron heater and the pipe coil was that the heat was more evenly distributed.

Air Washers.

Under the topic, "Air Washers, Their Construction and Effect," was taken up by Mr. Kauffman, who showed sketches of spray heads, showing their faults, believing that a good spray head would be a boon; the eliminators were good; the guarantees as to cooling air were too great for safety.

Air Leakage.

Under the topic discussion, "The Effect of Air Leakage around Windows on Heating Apparatus," Mr. Whitten showed on the board tests made by which the greater losses of heat through ordinary commercial sash and through sash protected by metal strips. Mr. Thompson said the tests were along a good line and if they could establish a standard of work which would permit contracts to be paid for when completed instead of waiting for a test in zero weather.

Saturday Morning.

At 10:30 **the final session** of the Society **was called to order by President Mackay.**

The first topic for discussion was "The Proportion of Radiator Surface and Method of Ventilating Rooms for Drying Macaroni," and it proved an interesting and fruitful subject. The gentlemen who took part in this discussion were Messrs. Weinshank, Hale and Kauffman.

Secretary Mackay read a letter from Mr. Olds in relation to **the ventilation of factories located in lofts** in New York, particularly those which come under the operation of the New York law, the present enforcement of the law, and calling attention to the organization of the Realty League, called into being to prevent the enforcement of the law and, if necessary, to secure its repeal.

Mr. Davis moved that this Society heartily endorses the New York ventilation law, the efforts of Mr. Walling to enforce the law, and protests against the repeal or amendment of the law. This motion was carried.

Upon motion of **Mr. Donnelly,** seconded by Mr. Blackmore, **the subject was referred to the committee on compulsory ventilation,** said committee to be enlarged by the appointment of members from New York.

Air Cooling.

A paper bearing the title, "Air Cooling," by **Theodore Weinshank,** was thereafter read by the author, as follows:

In the early days when a building was being designed the question of ventilation received little consideration. At present, however, there is a great demand for fresh air, even to the extent of compulsory legislation in a number of States. In pursuance toward this end the heating and ventilating engineer is not only expected to supply the necessary amount of air, but he must deliver it comparatively pure. In doing this he occasionally finds it impossible to so locate the air intake as to keep the air free from dust, soot, etc. This latter problem is now being solved in many cases by the introduction of air washers and purifiers. As a direct consequence of this latter introduction, the humidity, as well as the cooling of the incoming air, has become of great importance.

Air passing through a sheet of water, a spray, a mist, or any other arrangement for washing the air as ordinarily provided by the manufacturers, necessarily must raise the temperature of the water through which it passes, if the same is at a lower temperature than its own, and at the same time its own temperature is lowered.

If we assume that all the passing air comes in contact with the falling water, and that a total mixture takes place, also that

W = weight of water in pounds.
T = initial temperature of water in degrees F.
t = final temperature of water in degrees F.

Since the specific heat of water is unity, then the heat absorbed by the water in British thermal units (B. T. U.) is

$$W\ (t - T),$$

while the heat given up by the air if

w = weight of air in pounds.
s = specific heat of air; ¼ approximately.
T' = initial temperature of air in degrees F.

will become

$$w\ s\ (T' - t).$$

The above two quantities are equal as per assumption of a total mixture, that is

$$W\ (t - T) = w\ s\ (T' - t)$$

solving for t, first substituting ¼ for s we have

$$Wt - WT = \tfrac{1}{4}\, w\, T' - \tfrac{1}{4}\, wt.$$

$$4\, Wt - 4\, WT = wT' - wt$$

$$t = \frac{wT' + 4WT}{4W + w} \quad \ldots\ldots\ldots \quad (a)$$

or solving for W we have

$$W = \frac{w'(T' - t)}{4(t - T)} \quad \ldots\ldots\ldots \quad (b)$$

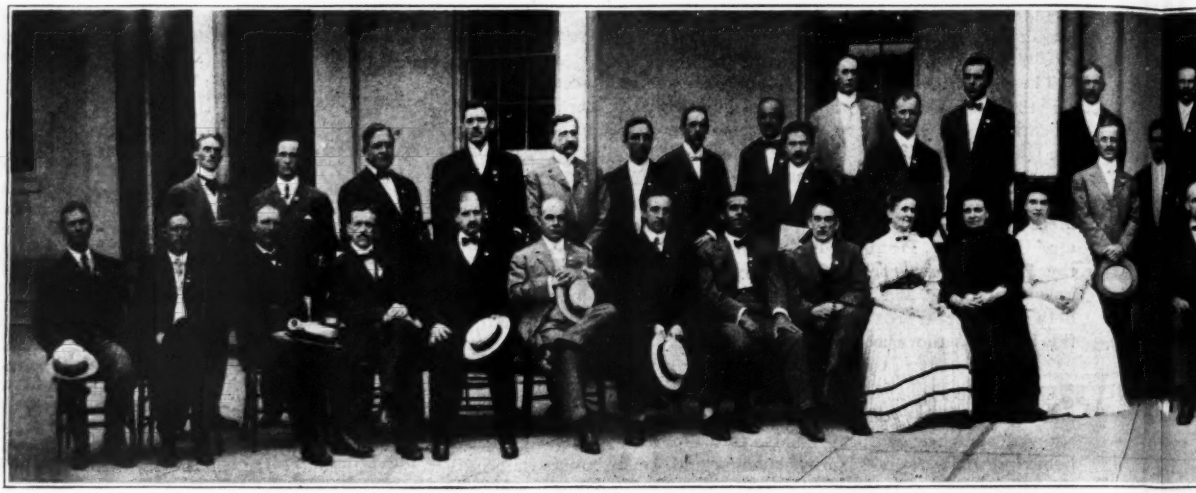
In (a) if we assume that we will use an equal amount by weight of air and water, then w will be equal to W and (a) will become

$$t = \tfrac{1}{5}\, T' + \tfrac{4}{5}\, T \quad \ldots\ldots\ldots \quad (c)$$

whence from (b) we can determine the amount of water required if we assume a final temperature t, which is in all cases greater than the original temperature of the water.

If, however, the same water is used over and over again, as is always the case where an air washer is used, then the difference in temperature between T' and T becomes zero, or T' equals T and (c) becomes $t = T'$; that is, the final temperature of the water becomes equal to the temperature of the incoming air. This is on the condition that no evaporation has taken place during the time the air and water were in contact.

Since a certain amount of evaporation does always take place, then the temperature of the air and water can never become equal, and the final mixture will always be less in temperature than the original temperature of the air, however small that difference may be.



Members and Guests of the American Society of Heating and Ventilating Engineers at

The evaporation of a certain amount of water, or the absorption by the air of a certain amount of moisture, has presented some very difficult problems for the heating engineer and the manufacturers of air-washing apparatus to solve.

As long as the air is of a lower temperature, or of a temperature equal to that of spray water, then the air in passing through a spray or sheet of water does not absorb any moisture, and the relative humidity of the air remains as before passing through the water, but if the temperature of the air is greater than that of the water, then evaporation takes place and the relative humidity of the incoming air increases.

The greater the difference between the temperature of the air and the temperature of the water, the greater the absorbing capacity of the air, and therefore the greater the relative humidity of the air after it has been washed.

In the summer time if ventilation is used and the temperature of the air would be, say, 90 degrees, and the relative humidity of the air before it enters the air washer would be, say, about 80 per cent., then the air after it passes through the air washer *may* be at the point of total saturation. Such air, if used for ventilation, will be stifling, and will deposit moisture on any article in a room, if the same should be of a lower temperature than that of the air.

To reduce the moisture or the relative humidity of the air under conditions as stated above, means must be provided either to cool the air by refrigeration, and, so to say, squeeze the water out of it, or to dry the air by some chemical action without this cooling process.

To elaborate the former process we may consider it under two heads: First, the reduction of the moisture in the air without reducing its temperature; and, second, the reduction of the temperature of the air.

The removal of the moisture or the lowering of the humidity is of far greater importance and is a far greater expense than the cooling of the air.

To illustrate this latter statement, let us assume a condition as follows:

Outside temperature, 82 degrees.
Relative humidity, 80 per cent.
Desired: Inside temperature, 70 degrees.
Relative humidity, 50 per cent.

At 82 degrees the weight of vapor mixed with one pound of saturated air equals .0226 pounds; therefore, at 80 per cent. relative humidity the weight of moisture per pound of air will be

$$.80 \times .0226 = .01808 \text{ lbs.},$$

and at 50 per cent. relative humidity

$$.50 \times .0226 = .01130 \text{ lbs.}$$

Therefore, to reduce from 80 per cent. relative humidity to 50 per cent. relative humidity, there must be removed

$$.01808 - .01130 = .0068$$

pounds of vapor, the temperature remaining the same.

If the heat of vaporization at the temperature of 82 degrees is 1058 B. T. U. per pound, then it will require

$$.0068 \times 1058 = 7.194 \text{ B. T. U.}$$

per pound of air to vaporize an equivalent amount of water.

This means that from each pound of air at the conditions mentioned above, we must remove 7.194 B. T. U. in order to condense an amount of moisture to bring the relative humidity from 80 per cent. down to 50 per cent., whereas in order to cool the air from 82 degrees F. to 70 degrees F., it will require only

$$.238\ (82 - 70) = 2.856 \text{ B. T. U.}$$

In order, then, to accomplish both the cooling and the removing of the humidity it will require

$$7.194 + 2.856 = 10.050 \text{ B. T. U.}$$

per pound of air. Since the weight of a cubic foot of dry air is .0733, the above may be stated as

$$10.050 \times .0733 = .737 \text{ B. T. U.}$$

per cubic foot of air per minute.

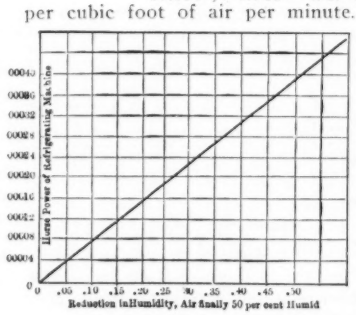


Fig. 1.

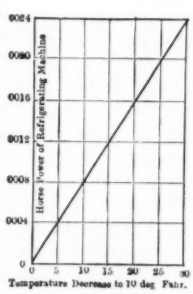


Fig. 2.

To remove this heat by a refrigerating machine, it would require work equal to about one-fifth or one-sixth of the heat removed, since the efficiency of a refrigerating machine is great than unity. (NOTE.—The apparent paradox that the efficiency of a refriger-

ers at its annual Summer Meeting, held at Niagara Falls, N. Y., on July 24 and 25, 1908.

ating machine is greater than unity is explained as follows: The working fluid, ammonia, receives heat from the brine and rejects heat into the condenser. The heat rejected into the condenser is greater than that received from the brine. The difference is found to be the heat received by the ammonia from the compressor. The work to be done by the compressor is not the mechanical equivalent of the refrigerating of the brine, but only that necessary to supply the difference between the heat rejected by the ammonia into the condenser and that received from the brine. See Ice-Making or Refrigerating Machines, Kent, page 988.) Hence the horsepower of a machine per cubic foot of air per minute is

$$HP = \frac{.737 \times 778}{5 \times 33{,}000} = .0035.$$

To put this in a general form, let us assume that
T=original temperature of air.
t=final temperature required.
w=weight of moisture in one pound of saturated air at T degrees F.
W=weight per cubic foot dry air at T degrees.
H=relative humidity at T degrees.
h=relative humidity desired at t degrees.
L=latent heat of vapor at T degrees F.
Q=number of cubic feet of air to be cooled.

Then
$$HP = Q\frac{[.238(T-t)+Lw(H-h)]778W}{5 \times 33{,}000} \quad . \quad . \quad . \quad (d)$$

Assuming that temperature to remain the same and that only the humidity is to be changed, then in (d) T and t are equal and (d) becomes

$$HP = Q\frac{Lw(H-h)778W}{5 \times 33{,}000} \quad . \quad . \quad . \quad . \quad . \quad (e)$$

The weight of a cubic foot of dry air is nearly constant between the temperature of 40 degrees F. and 100 degrees F. (the weight of a cubic foot of dry air at 42 degrees is .079, and at 100 degrees is .0707). Hence, we may assume the following conditions:

Let W be constant, then Lw at the desired temperature of 70 degrees F., and 50 per cent. relative humidity, also will be constant, and (e) becomes

$HP = (H-h)\ .0008$ when Q is unity.

With the horsepower and $(H-h)$ being the only variables in the equation, we may take $(H-h)$ as abscissas and horsepower as ordinates and produce a curve as shown in Fig. 1.

In (d) if we assume that the relative humidity is maintained constant, and that the temperature only is changed, equation (d) becomes

$$HP = \frac{.238(T-t)778W}{5 \times 33{,}000} \quad . \quad . \quad . \quad . \quad . \quad (h)$$

Again, considering W as constant and $Q=1$, equation (h) becomes

$$HP = (T-t)\ .00008 \quad . \quad . \quad . \quad . \quad . \quad (k)$$

With the horsepower and $(T-t)$ being the only variables, if we work out the results for a range of from 5 to 30 degrees, the curve shown in Fig. 2 is obtained.

The sum of the horsepower of the two curves will give the required power for any other condition, assuming that 70 degrees and 50 per cent. relative humidity to be the standard for ventilating purposes.

The horsepower thus obtained for different temperatures and different percentages of humidity is on the basis of a refrigerating apparatus or an ice-making apparatus of direct expansion type.

If a moderate temperature brine type apparatus is used, the horsepower required, and hence the cost of the air-cooling installation, will be somewhat increased.

It is obvious that the latter system requires twice the expense for coils or pipe surface, and also requires twice the temperature interval between the temperature of the expending ammonia and the temperature of the air, required by the direct expansion system, since the heat requires to be transmitted through the walls of two sets of pipes instead of one.

This, of course, means that the power required would be increased in the same degree, and the cost of equipment in the same degree also.

The brine system, however, is the most desirable, since there is more opportunity to automatically control the temperature of the brine for different requirements of outside temperature and relative humidity.

A humidostat can be placed in the main discharge pipe of the ventilating fan to properly control the flow of the brine into the cooling coils, and thereby control the temperature of the cooling coils so that a constant relative humidity and any desired temperature may be obtained.

Since blast coils are used in connection with ventilating fans for winter use, the same coils can be used for cooling purposes in the summer time, as the

temperature of the brine used for such purposes is never such that it will cause the pipes to be covered with ice, so as to reduce the free area through same.

The reading of this paper was followed by an interesting and instructive discussion.

Professor John R. Allen's paper, "Coefficient of Transmission in Cast Iron Radiation," which was read from manuscript at the annual meeting of the Society in New York City last winter, and then ordered printed, was now placed under discussion, which was interspersed with commendation to the author for this valuable addition to heating literature. The absence of Prof. Allen on this occasion was regretted by the meeting.

The following topics were thereafter discussed in the order in which they are given herewith:

"Temperature for Testing Direct Radiator Systems."

"Proper Proportion of Air Spaces in Direct Radiators."

"The Relative Corrosion of Wrought Iron and Steel Pipes."

"The Efficiency of Different Types of Radiators."

"The Accuracy of Prevailing Methods of Rating House Heating Boilers."

"The Comparative Sizes of Dry and Wet Returns in Gravity Steam Heating Apparatus."

Following this discussion the society adjourned.

Entertainments.

The social side was not neglected. The most notable feature of this part of the meeting being **an excellent vaudeville entertainment** in the International Hotel Park, which had been reserved for the society and its guests, and which was greatly enjoyed.

Another pleasant entertainment feature was the ladies' tour of inspection to the Natural Food Company's conservatory, where a most palatable demonstrative lunch was served. **Jno. K. Allen.**

Association News

Trenton, N. J.—The Master Plumbers' Association held its sixth annual outing at Frese Woods on Wednesday, July 29, and the event was a perfect success in every respect.

Davenport, Iowa.—The Master Plumbers' Association of this city has been incorporated, with a capital stock of $10,000. The directors of the organization are Henry Dunker, Philip Sonntag, Guy Ahrens, Roy Kerker, A. Clayton, Clark Reed and C. Schmidt. The officers are: President, Guy Ahrens; vice-president, Philip Sonntag; secretary, A. Clayton; treasurer, Clark Reed.

Schenectady, N. Y.—The Master Plumbers' Club of this city will hold its second annual clam-bake at Sauter's Grove on Saturday, August 15. Cars will leave the club room at 1 o'clock sharp, and the bake will open at 3 o'clock. Tickets are two dollars apiece, and a most enjoyable time is assured. C. F. Shank is secretary of the clam-bake committee and he reports that all signs point toward a good attendance.

Chicago, Ill.—The eleventh annual meeting of the International Acetylene Association will be held at the Auditorium Hotel in this city on Monday, Tuesday and Wednesday, August 10, 11 and 12. The formal meetings will be held in a special convention hall set aside for this purpose in the above hotel. Papers, discussions and reports of committees will be presented by members prominent in the acetylene industry and are designed to be of a very interesting and instructive nature. Parties intending to be present at the convention are requested to notify the secretary of the association, A. Cressy Morrison, 157 Michigan avenue, Chicago.

Newark, N. J.—The fifteenth annual outing of the Newark Association of Master Plumbers will be held on Wednesday, August 12. A trip to Port Au Peck and a genuine Rhode Island clam bake will be enjoyed. The trip will be made via the New Jersey Central, leaving Newark at 9 a. m., and the Sandy Hook boat, which leaves the foot of Rector street, New York, at 10 a. m. All arrangements for the outing are completed and the committee promises it will exceed in interest the one held at Rockaway Beach last year, which will be remmbered by all who were fortunate enough to attend. The tickets are $5 each and can be had from F. J. Sturn, 43 Hill street, who is treasurer of the committee. The following gentlemen are also on the committee: Ira Budd, chairman; W. I. Champlin, A. Selden Walker, Robert Berla and Louis Maier, ex-officio.

CONVENTION DATES.

August 10-12, 1908.—The eleventh annual convention of the **International Acetylene Association** in Chicago.

August 25-28, 1908.—Twenty-sixth annual meeting of the **American Public Health Association,** at Winnipeg, Manitoba.

Wholesale Plumbing

The Empire Lead Company, of Nokomis, Ill., has been incorporated with a capital of $25,000. The incorporators are G. S. Wilson, A. F. Weaver and George F. Heldebrandt.

The Robert Rom Company, of Milwaukee, Wis., was visited by a fire on Sunday, July 26, causing a loss of about $2,500 to its pipe shop. A spark from a passing locomotive started the fire.

The Sanitary Floor Company, of Chicago, has been incorporated with a capital of $5,000 to manufacture composition plumbing specialties. The incorporators are Frank A. Howard, Frank Davis and E. A. Rush.

John C. Wickes Company, of Brooklyn, N. Y., has been incorporated with a capital of $5,000 to deal in plumbing specialties. The directors of the company are M. A. Lewis, M. A. Freedman and Harold Taylor, of 280 Broadway, New York.

The plumbing supply firm of Malbin & Kammerman, 922 Third avenue, New York City, has been dissolved by mutual consent and the business will hereafter be conducted by Mayer Malbin at the old stand. Mr. Malbin has assumed the payment of all debts of the old firm.

The Plumbing supply house of G. & A. Bargamin Company, at 14-18 South Ninth street, Richmond, Va., was visited by a fire on Sunday night, July 19, causing a damage of about $30,000. The loss is covered by insurance and the building will be repaired as soon as possible.

Crown Brass Company, of Detroit, Mich., filed a deed of assignment on Tuesday morning, July 28, and several of its creditors filed a petition in bankruptcy against the company on the afternoon of the same day. The court appointed R. R. Alexander as receiver and fixed his bond at $5,000.

The Fort Pitt Lead and Metal Company, of Pittsburg, Pa., is the name of a new concern that has just been incorporated in accordance with the laws of Pennsylvania, and which will produce and market lead and various lines of lead products. J. L. Hutchinson, Herman S. Davis and L. F. Cotter are the incorporators of the new concern.

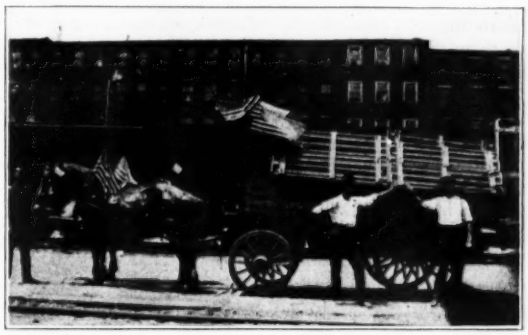
The Oberndorf Company, Pittsburg, Pa., is the name of a new concern that has been formed and incorporated by Edward Oberndorf, H. D. Montgomery and E. Sunstein, of that city. The company will engage in the manufacture of plumbing accessories and supplies from wood and metal. The general offices will be located in Pittsburg.

The New England Plumbing Supply Company, of Springfield, Mass., has just added another story to its four-story building on Bridge street in that city, thereby securing an addition of 5,000 square feet of floor space. E. T. Davis, the proprietor, states that this expansion was made imperative by increased business, and he adds that his section of New England has been affected but very little by the hard times which seem to have visited some parts of the country. He is looking forward to very prosperous times and wishes to be prepared for them.

The Compound Injector and Specialty Company, of Chicago, announces by its general manager, George J. Dehn, that on and after August 1 its factory and office will be located at 42 North Fifty-second avenue, near Kinzie street, where it will occupy its own new building, which has just been completed. This building is a two-story brick structure, 50x65 feet, equipped with the latest conveniences and up-to-date machinery for the production of the plumbing specialties manufactured by the company. These new facilities will enable the company to take care of its rapidly increasing business, and the new location is conveniently reached by elevated and surface roads, making the change also in this respect a decided improvement.

J. F. Kelly, one of the best known men in the plumbing supply trade in Pittsburg, Pa., and vicinity, and for the past eight years connected with the Bailey-Farrell Mfg. Company, of that city, has severed his connection with that concern, and has removed to Los Angeles, Calif., where he will have charge of the branch of the John Douglas Company, of Cincinnati, O. Mr. Kelly has a great many close friends in Pittsburg who will regret losing him, but all will be glad to know that he advances to a responsible position in the same line of business, and in a district where he is as well known as he is in the Greater Pittsburg district. Mr. Kelly has spent considerable time in California, and is well known to the plumbing trade and architects of that state. His wife is at present in California, where she has been for some time, and where Mr. Kelly will now make his permanent home. Through **"Domestic Engineering,"** the hosts of local friends unite in extending to Mr. Kelly their earnest wishes for success and continued prosperity.

For some time National Lead preferred, as well as the common, has attracted considerable market attention. The preferred was quoted around 103 this week. It is a 7 per cent dividend issue. It turns out that the price of the preferred is hampered by the fact that there is a provision in the charter of the National Lead Company that the preferred stock may be retired at par. The company has agreed that this charter privilege shall not be exercised before January 1, 1910. While there is a remote probability that the company will exercise this privilege, still the privilege exists,



"Ready for a long journey." A load of Ronalds & Johnson Company's cast iron soil pipe and fittings, crated for export shipment from Philadelphia to the United States Naval Hospital at Yokohama, Japan.

and conditions might arise which would cause the management to avail itself of it. Should this be done there will be a net loss in the investment account for the amount paid above par. The company has now outstanding $24,463,600 of preferred stock, and to retire it would require an issue of bonds. In a way the preferred dividend is a fixed charge, but its non-payment does not subject the property to foreclosure, whereas a mortgage while it would reduce the amount now paid out in dividends, would burden the company with the rights of bondholders.

Concerning Changes in Lists of Plumbers' Brass Goods.

The National Association of Brass Manufacturers has just issued the following circular letter to the **Manufacturers and Jobbers of Plumbing and Steam Supplies in the United States:**

"The National Association of Brass Manufacturers fully realizing the inconvenience to the trade involved in changes of lists, but realizing, however, that **changes must be made because of changing conditions,** and having in mind the best interests of the manufacturers and jobbers of the country alike, **are laboring for the establishment of uniformity in dates for these necessary changes.**

"With this in mind, at a meeting of this Association held in Boston, in June, 1907, it was decided that such necessary alterations, or revisions, would be made and put into effect on the first day of January, 1909.

"A committee was appointed to work out the details of such changes that the jobbers throughout the United

States might have sufficient notice to be prepared for these changes when they should take place.

"Since then contingencies have arisen that have made it seem wise to **defer the changes to a later date.**

"At a recent meeting of the Brass Association held in Toronto, Ont., it was decided that **all changes in lists in plumbers' brass be made and published not later than the first day of July, 1909, such changes to go into effect on the first day of January, 1910.** This advance notice is given for the benefit of those who contemplate issuing catalogues or other printed matter.

"We were appointed a committee to take it up with the jobbers, with a view of not only securing the co-operation of the trade generally, but also uniformity of action on the part of the other manufacturers in the plumbing and heating lines to the end of securing their co-operation, that if possible all catalogue **changes made in all these various lines might be made and published July 1st, 1909, and be made effective January 1st, 1910,** and with the further hope that the plan of a uniform date for changes in lists might prevail thereafter.

"In accordance with the instructions of our Association we presented this matter at the recent joint meeting of the supply associations in Detroit, Mich. We are pleased to say that this plan was unanimously approved and concurred in, and that it has also the endorsement of the National Committee.

"We now appeal to all jobbers and manufacturers to use their good offices with the different Manufacturers' Associations—also all manufacturers in lines that may not be organized—**with the view of making the movement a united one.** We ask that you personally lend us such assistance as you may be able, and for any suggestions that you may have to offer.

"Please address all communications on this subject to our Commissioner, Mr. Wm. M. Webster, suite 1110 Schiller Bldg., Chicago. Respectfully,

"A. D. Sanders, J. J. Ryan, Wm. M. Webster, Committee."

Wholesale Heating

The Dighton Foundry Company, of Taunton, Mass., has been incorporated, with a capital of $50,000. The directors are Herbert Q. Presby, Fred. P. Leonard and William L. White.

The Argand Boiler Company, of South Norwalk, Conn., has been organized with a capital of $6,000 to manufacture the steam and hot water heaters formerly produced by the Colonial Foundry & Machinery Company. The officers of the new company are: Edward S. Meeker, president; Charles H. Aisthorpe, treasurer; and William S. Folant, secretary.

The annual clam bake tendered the employes of the Hart & Crouse Company, and the New York Radiator Company, of Utica, N. Y., by those companies, was held Saturday, July 25, at New Hartford, N. Y. Headed by a band, the employes to the number of three hundred assembled in front of the works of the first named company and paraded the town, with banners flying, before departing for the bake. At the resort a series of ball games and field events made up the program for the holiday, not forgetting the "bake," of course. An official of the company stated that this form of "oil" had been found very efficient in preventing friction between the company and its men, and that it was considered a good paying investment.

The American District Steam Company, of Lockport, N. Y., on Friday, July 24, suffered the loss by fire of a portion of its Tonawanda plant, where its casing mill and foundry are located. Plans are made for rebuilding the burned portion on an enlarged scale, and it will be of fire-proof construction as nearly as possible. The company informs us that its business for the season will not be delayed on account of the fire. The loss was fully covered by insurance.

United States Heater Company, of Detroit, Mich., announces that it has just opened an office and salesroom at 139 Jefferson avenue in that city. This is an exceedingly desirable location on one of the main business thoroughfares of the city and only a short distance from the steam and electric roads and the various boat lines. The new office and salesroom will be known as the Detroit branch, and the salesmen operating in the middle states, who have formerly made their headquarters at the general offices of the company, will now report at this branch. A complete line of samples of the company's boilers and radiators has been installed and a local force will take care of the trade, architects and others interested in modern heating with low pressure steam or hot water.

The Norristown Magnesia & Asbestos Company, at Norristown, Pa., by its general manager, Chas. S. Platt, states that its new plant is now in full operation, enabling the company to fill all orders promptly. This company has, within a few years, outgrown its factory capacities time and again, until it now has three large mills running, two moulded and wool felt mills, occupying one city block, and one corrugated and air cell mill, occupying three and one-half acres. This tremendous growth is a pleasing example of the great possibilities that lie in front of even small concerns when they are headed by the right men. Another element that has had much to do with the success of the company can no doubt be found in the guarantee that accompanies its products, this namely: that they can be returned and money will be refunded if they are not as represented.

Contemplated Work

Washington, D. C.—Sealed proposals will be received at the office of the supervising architect until 3 o'clock p. m. August 24, 1908, for the construction (complete) of the United States postoffice at Logan, Utah, in accordance with the drawings and specifications.

Washington, D. C.—Sealed proposals will be received at the office of the supervising architect until 3 o'clock p. m. August 19, 1908, for an extension, remodeling, etc., including plumbing, gas piping, heating apparatus, electric conduits and wiring to the United States postoffice and custom house at Petersburg, Virginia, in accordance with drawings and specification.

Learning Early.

Teacher. "If you are kind and polite to your playmates, what will be the result?"

Scholar. "They'll think they can lick me."—Philadelphia Inquirer.

Steam and Mill Supplies

President Charles F. Aaron, of the American Supply and Machinery Manufacturers' Association, who was elected at the recent convention of the organization at Richmond, Va., has appointed the following standing committees for 1908-1909: Conference and Grievance Committee.—Samuel L. Moyer, chairman, Lunkenheimer Company, Cincinnati, Ohio; N. A. Gladding, E. C. Atkins & Company, Inc., Indianapolis, Ind.; E. C. Hinman, American Steam Pump Company, Battle Creek, Mich.; H. B. Lupton, Oliver Iron and Steel Company, Pittsburg, Pa.; M. W. Mix, Dodge Mfg. Company, Mishawaka, Ind. Membership Committee.—W. S. Paden, chairman, Northampton Emery Wheel Company, Chicago, Ill.; J. E. Kelley, Simonds Mfg. Company, Fitchburg, Mass.; Chas. P. King, American Iron and Steel Mfg. Company, Atlanta, Ga.; D. K. Swartout, Ohio Blower Company, Cleveland, Ohio; J. H. P. Wharton, La Belle Iron Works, Steubenville, Ohio. Credentials Committee.—F. A. Hall, chairman, Yale & Towne Mfg. Company, New York; H. J. Grover, Brown & Sharpe Mfg. Company, Providence, R. I.; Willard Parker, Pennsylvania Shafting Company, Spring City, Pa. Press and Publicity Committee.—H. J. Grover, chairman, Brown & Sharpe Mfg. Company, Providence, R. I.; J. E. Osgood, J. M. Carpenter Tap & Die Company, Pawtucket, R. I.; G. L. Gillon, Watson-Stillman Company, New York. Resolutions Committee.—John Trix, chairman, American Injector Company, Detroit, Mich.; John W. Neil, John H. McGowan Company, Cincinnati, Ohio; Edmund F. Smith, Baeder, Adamson & Co., Chicago, Ill.; Joseph W. Wall, Gardner Governor Company, Quincy, Ill.; Chas. O. Wood, T. B. Wood's Sons Company, Chambersburg, Pa. Committee on Rules and Order.—A. D. Hernance, chairman, Hermance Machine Company, Williamsport, Pa.; F. A. Ball, L. S. Starrett Company, Athol, Mass.; F. F. Chandler, Chandler & Taylor Company, Indianapolis, Ind. Convention and Entertainment Committee.—T. H. Dickerson, chairman, New York Belting & Packing Company, New York; D. J. Campbell, Dodge Mfg. Company, Mishawaka, Ind.; Clement Restein, Clement Restein Company, Philadelphia, Pa.

Obituary

Carl Lunkenheimer, first vice-president of the Lunkenheimer Company, of Cincinnati, Ohio, passed on last week at Pasadena, Cal., where he had resided for several years on account of his poor health. His funeral was held in Cincinnati on Monday, July 27.

Thomas Hyde, of Albany, N. Y., passed on recently at his home in that city. Mr. Hyde had been connected with the plumbing trade for many years, and he was probably best known as the manufacturer of a patented water closet for public buildings.

Edward S. Bartlett, president of the Trebert Gas Engine Company, of Rochester, N. Y., was drowned early Saturday morning when his automobile ran at full speed into the Erie Canal. Miss Geraldine Tumilty, a daughter of a prominent family in that city, accompanied him on the fatal trip, and she, also, lost her life.

Samuel E. Young, secretary of the Western Plumbing Supply Company, of 20-22 Desplaines street, Chicago, passed on from heart failure at his residence, 3075 Kenmore avenue, in this city, on Saturday evening, July 25. Mr. Young had been associated with the plumbing trade in Chicago for over forty years and few persons have a larger list of personal acquaintances and friends in the trade than Mr. Young had, and to all of these the intelligence of his demise caused a shock and a sense of bereavement. Mr. Young was born in Chicago in 1851 and was educated in the St. Patrick's Christian Brothers' School at Desplaines and

THE LATE SAMUEL E. YOUNG.
Secretary of the Western Plumbing Supply Company, of Chicago.

Adams streets. Having finished his education he obtained employment with E. Baggot, with whom he remained for twenty-five years, after which he engaged at once in the plumbing supply business at 48-50 South Franklin street, Chicago, under the name of the Western Plumbing Supply Company. Here he remained for fourteen years, or until 1905, when the business had grown to such proportions that larger quarters became an absolute necessity. The present quarters on Desplaines street were then secured and the business continued with increasing success. As Mr. Young incorporated the business a few years ago it is not thought that his demise will cause any notable change in its

conduct. Mr. Young was a member of the Knights of Columbus and of the National Union, and his great fondness for out-door life made him a popular member of the Chicago Gun Club, the Garfield Gun Club and the Chicago Auto Club. His funeral took place last Tuesday and was attended by many representatives of the Chicago Master Plumbers' Association and of the wholesale plumbing interests of Chicago. The honorary pallbearers were: C. D Street, of the Street & Kent Mfg. Co.; J. J. Ryan, of J. J. Ryan & Co.; M. Naughton, Austin Doyle, John Corcoran and Thomas Meloy. The active pallbearers were the following employes of the Western Plumbing Supply Company: Geo. Barron, B. F. Desbrow, Chas. Brayley, John Caul, John Tyne and Joseph Belisle. Mr. Young is survived by his wife and two daughters.

John H. Pierce, formerly president of the Western Tube Company, of Kewanee, Ill., whose demise was chronicled in this column last week, was buried last Sunday in Kewanee. The funeral was attended by many prominent business men and politicians, special cars having been chartered from New York, Pittsburg and Chicago to accommodate friends of the dead manufacturer. Senator B. F. Baker, treasurer of the Kewanee Boiler Co., was marshal of the funeral procession, which included the ranks of organized labor of Kewanee. The interment took place at Pleasant View cemetery. Tribute was paid to Mr. Pierce as a brilliantly successful industrial leader, who had overcome many difficulties in making Kewanee the home of one of the greatest manufacturing enterprises of the middle west, the Western Tube Company. His service in behalf of the public and as a worker in the republican party also was mentioned, as well as the fact that he was the first mayor of Kewanee. Among those attending the funeral were: Chief Justice John P. Hand, of Cambridge; John Duncan, of Pittsburg; and L. C. Huesman, of Indianapolis.

Personal

James Mackay, of the Kellogg-Mackay-Cameron Company, of Chicago, is making a trip through the east, visiting Syracuse and other business centers.

Frederick D. P. Ingalls, formerly with Edward Joy, of Syracuse, N. Y., has opened an office in the Rosenbloom building, that city, where he will do a consulting mechanical and heating engineering business.

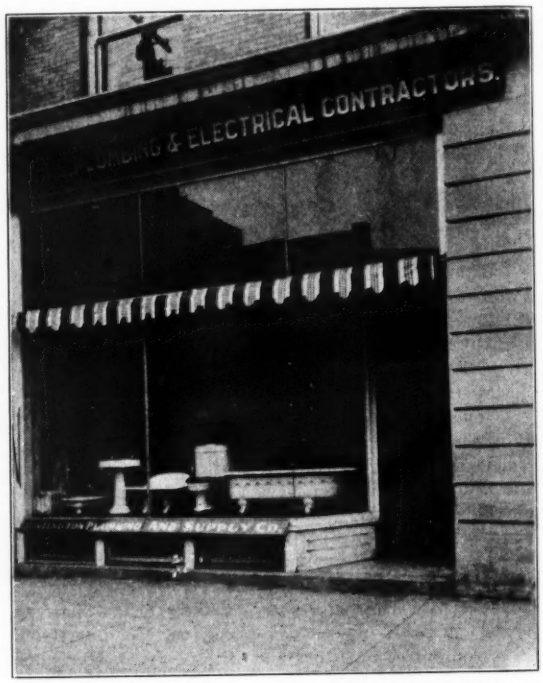
Frank K. Dibley, the new manager of the L. Wolff Manufacturing Company, in Denver, Colo., is fast becoming acclimated and states he is much pleased with the city. Mr. Dibley's former home was in Milwaukee, and his family is still there, but he expects to bring them to Denver in the near future.

James A. Donnelly, of 132 Nassau street, New York, was a visitor in Oswego, N. Y., on Monday of this week, where his system of heating is being installed in the new round house being erected for the New York Central Railroad, for which the Thompson-Starrett Company, of New York, has the contract.

Saginaw, Mich.—Brown Bros. Company has secured the contract for the heating of the Jerome school at its bid of $1,265.

Financial Trouble

Huntington, W. Va.—The Huntington Plumbing & Supply Company, whose place of business is located in the Frederick building, on Fourth avenue, has gone into the hands of a receiver. The schedule of liabilities and assets has not yet been filed. The company



Outside view of the establishment of the Huntington Plumbing and Supply Co., of Huntington, W. Va., which has just gone into the hands of a receiver.

has been in business for a number of years, and has done the plumbing and electrical work on many of the largest buildings in this city.

Metal Market

New York Metal Market, July 28.

Copper, Prime Lake	$13.25
Copper, Lake, Arsenical brands	13.12½
Copper, Electrolytic	13.12½
Antimony, Cookson's	8.50
Spelter	4.62½
Lead	4.57½
Straits Tin	30.55

Chicago Iron Market, July 30.

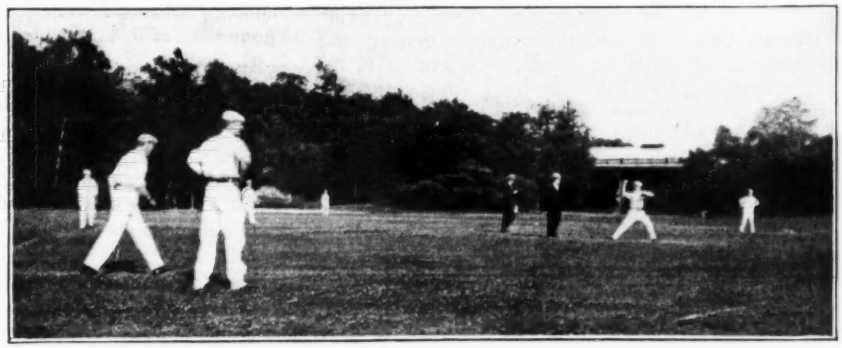
Southern, No. 2 Foundry	$15.85-16.85
Lake Superior Charcoal	20.00-20.50
Lake Superior Coke Iron, No. 2 Foundry	17.00-17.50

July 30, 1908:

Foundry iron was the same price as week previous
same price as the month previous
$8 less per ten than the year previous
Copper was 3/8c more a lb. than month previous
11 less a lb. than the year previous

Boston, Mass.—The copper market has taken a decided turn for the better during the past few days. Improving sentiment has finally crystallized into advancing prices and the expected enlarged demand has at last materialized. In one case a large copper producer has advanced his price to 13¼ cents on all contracts for August delivery. Customers, who for some time past have been short on supplies, but who have been hoping against hope that something would weaken the market, seem at last to be convinced that the change for the better has come to stay and now all of a sudden they are getting very anxious regarding their supplies for the future and are beginning to buy quite freely.

New York, N. Y.—A more cheerful tone pervades the iron market, even Pittsburg developing some optimism, says "The Iron Age." The volume of business, taking it as a whole, is slightly better, but prices still display irregularity, and in some branches are even a little lower. There has been some gain in the rate of operations, but mills are often forced to lie idle for considerable periods to wait for the accumulation of sufficient specifications to justify a brief period of running. In some sections the pig iron markets are easier, while in others they are steady. Pittsburg reports sales of Bessemer at $15.65 valley furnace. A Pennsylvania structural mill and bridge shop bought 12,000 tons of basic pig at close to $25.00 for delivery over four months. An Ohio car builder purchased about 5,000 tons of different irons, one-half thereof being malleable Bessemer.



From the recent ball game of Chicago Master Steam Fitters versus Boiler and Radiator Salesmen at Ravinia Park.—Picture of field—Boiler and Radiator Salesmen to bat, Douglas pitching, Barry McCabe coaching, and Story on third.—Photograph by our Mr. Winslow.

The Middle States

Youngstown, O.—C. F. Henry has received the award of the contract for the plumbing and hot water heating systems that will be installed in the large new business and apartment building that is being built here for H. F. Duesing.

Toledo, O.—The American Heating and Ventilating Company, of this city, has been awarded the contract for the heating and ventilating of the North Side public school building at Defiance, O. The contract amounts to $1,611.

Springfield, Ohio.—The Crain-Stuart Company, whose incorporation with a capital of $20,000 was mentioned last week in this column, has purchased the plumbing business of the R. P. Willis Company, of this city, and will continue it at 20 South Limestone street. The officers of the new company are: C. R. Crain, president; C. L. Bauer, vice-president; W. A. Bauer, treasurer; Chas. C. Stuart, superintendent.

Kalamazoo, Mich.—The Wheeler-Blaney Company has been awarded the contract for the installation of a new and modern heating plant in the Woodward avenue school building.

Youngstown, O.—The contracts for the plumbing and hot water heating systems that will be required for the handsome new residence that is being built here for Frederick C. Wolfe have been awarded to L. B. Scheible & Sons.

Youngstown, O.—The contract for the plumbing system for the new $50,000 public school building that is being erected in this city at Kensington and Bidwell streets has been awarded to Jacob Brenner. The contract calls for the installation of a large number of fine fixtures. The contract for the heating system for the structure has been awarded to Bartlett Bros., also of Youngstown. A high pressure steam heating system will be installed.

Moline, Ill.—The Moline Heating and Construction Company, of this city, has been awarded the contract for the installation of heating and sprinkler systems in the Deere branch house now being erected at Omaha. The consideration amounts to about $25,000.

Notes from the West

Marshalltown, Iowa.—The McCarten Plumbing Company has been awarded the contract for the plumbing in the Whitney residence, now being erected in this city.

Alma, Neb.—Metzger & Olson have secured the contract for the plumbing and heating in Wm. Haskell's new residence. They also have a number of other contracts on their books.

Waterloo, Iowa.—Zook & Bentz have been awarded the contract for the plumbing, heating, ventilating, electric wiring and gas fitting, and also the sheet metal work and placing of fire escapes in the new East Waterloo High school and Manual Training building to be erected at once. This is the largest contract ever secured by a local firm here, the contract amounting to about $23,000.

MOUNTAIN AND PLAIN

Fort Collins, Colo.—Henry G. Diercks, president of the Fort Collins Master Plumbers' Association, reports a good amount of work on hand and business generally good.

Denver, Colo.—The Wallace Plumbing Company has two good sized contracts for plumbing on hand, one being for the house of J. Stanley Edwards, at 1103 Race street, and the other for the installation of about forty fixtures for Mrs. C. S. Thomas at 718 16th street.

Denver, Colo.—The Suess Plumbing Company has the contract for installing about fifteen fixtures in the Hayes apartments at 1005 Thirteenth street. Gus. M. Wirth & Company have secured the contract for the plumbing for the remodeling and addition to the block of A. Gregg, at Eighth and Broadway, which calls for about twenty-five fixtures. The Small Bros. Plumbing Company has secured the contract for the plumbing in Hans Nelson's apartments at Twenty-third and Race streets. The Hunter Plumbing Company was the successful bidder for the plumbing to be installed in the Birney apartments on Grant avenue between Colfax and Sixteenth avenues. This is a large contract and calls for about one hundred and thirty-five fixtures.

Chas. A. Dehn.

New York News

Brooklyn, N. Y.—Philip Shapiro, of 1050 DeKalb avenue, is plumbing two buildings on Park avenue and a six story apartment house on South Third street.

New York, N. Y.—Otto Goldberg, formerly at 71 East 116th street, has moved his plumbing business to more commodious quarters across the street at No. 68.

New York, N. Y.—Bligh & Engel, of 410 Fourth avenue, are installing a steam heating plant in a new residence for Lankenauer Brothers at 405 Fourth avenue.

New York, N. Y.—John V. McEvily, a contracting plumber of 2015 Arthur avenue, Bronx, has filed a petition in bankruptcy with liabilities of $15,596, and assets of $5,683.

Utica, N. Y.—Geo. L. Brucker, of 77 South street, is doing the plumbing in the new building being erected at the corner of South and Miller streets for J. H. Grant, containing four stores and nine apartments.

Johnstown, N. Y.—Frank Randall has been awarded the contract for the plumbing in the new County building, the hot water heating in the new Old Ladies' Home and the plumbing in the new residence for E. P. Judson, being erected at Broadalbin, N. Y.

Syracuse, N. Y.—Thomas E. Gildea has secured the contract for the installation of new heating and ventilating systems in the old Court House and County buildings, at his bid of $10,493. The contract for new plumbing in these buildings will be awarded later.

Utica, N. Y.—The Utica office of Edward P. Bates, of Syracuse, N. Y., reports a very satisfactory amount of business in hand, among which are several large automatic sprinkler contracts and contracts for high pressure piping and steam heating in a number of factories.

Oswego, N. Y.—Keefe Bros. have been awarded the contract for installing two new cast iron boilers in the city almshouse and making alterations to the heating system in the same. Oswego master plumbers and steam fitters report about the usual amount of business in hand at this season of the year.

New York, N. Y.—The Wm. Vail Company has been incorporated with a capital of $10,000 to conduct a plumbing business. The incorporators are William Thompson, of 788 Knickerbocker avenue, Brooklyn; M. G. Vail, of Tuxedo Park, N. Y.; James W. Murphy, of 67 West 87th street, New York City.

Brooklyn, N. Y.—The business of the late John Paterson, at 1204 Fulton street, is being conducted by James Johnston, who served in the capacity of foreman for Mr. Paterson for a number of years, and who is now a partner in the firm with Mr. Paterson's heirs. The firm's name has been changed to Paterson & Johnston.

New York, N. Y.—Henry J. McVeety has purchased the interest of his former partner, John F. Black in the plumbing business of McVeety & Black at 200 East Ninety-sixth street. Mr. Black has been connected with the business for the past three years, prior to which he was associated with his brother on Eighth avenue.

Johnstown, N. Y.—Wesley Lynes, of 15 East Main street, has the contract for the steam heating in the new county building; the plumbing in the new Old Ladies' Home; the hot water heating and plumbing in the new residence being erected at Broadalbin, N. Y., for George Chapman; the installing of a new steam heating plant in the residence of W. McKie and the hot water heating in the residence of Veeder Lasher.

Ask us; we can probably tell.

Southern Notes

Jackson, Miss.—B. O. Peters, of this city, has been awarded the contract for the installation of a steam heating plant in the public school building at Canton, Miss.

Meridian, Miss.—The Guy & McPhillimy Plumbing Company has just started in business at 517 Twenty-fifth avenue. The firm is composed of L. T. Guy and J. A. McPhillimy.

Wheeling, W. Va.—The contract for the plumbing system that is specified for the new home for the Young Men's Christian Association in this city has been awarded to William Hare's Sons. The contract amounts to about $18,000, and calls for the installation of a large number of fine fixtures, including several shower baths, lavatories, toilet rooms, etc.

A Good Man Gone Wrong

(Concluded from page 99)

simply aimed at **conspiracy**, and **in the establishment of resale price nobody desires or expects a collective effort on the part of jobbers or manufacturers that would even savor of a conspiracy.** A manufacturer has an absolute right to agree with you as an individual, that you shall maintain the price on his goods as you act as agent in the distribution of them. He has a right to make individual contracts whenever and wherever he pleases, properly to conduct his business, as he is in no sense a monopolist nor in his **individual contracts does he create a conspiracy against public policy.**

"Inferior Goods is a hob-goblin," according to our illustrious correspondent. Possibly the Inspector of Plumbing of New York, and his recent drastic action to clean out the inferior and short weight goods dumped on that market, is a myth. **The facts are staring him in the face at every turn.** He should awaken from his **slumber** and begin to see that **the day is about passed when this or any other trade will stand for a business conducted on the assumption that inferior goods may be palmed off for "just as good."**

The builder of the $1,200 cottage may not be as able to put in the fancy fixtures as his millionaire neighbor does, but **when he buys and pays for soil pipe supposed to weigh 65 pounds, and has installed something weighing 20 per cent less, stamped with all the marks of extra heavy soil pipe,** he will not **receive** what he **wants** nor **pay** for that which **he desires.**

The thinking jobber, plumber and steamfitter is alive to this situation and does not propose much longer to stand being imposed upon or having to represent goods of a specified quality or weight when they in no sense measure up to the quality or quantity with which they are brought into competition.

There are many **things** on the market that have been palmed off on the unsuspecting public for years, and our correspondent must know it. Every one else does.

What the trade and the public want is a square deal, and no amount of sophistry in an attempt to belittle conditions or negative the progress now making toward this goal will be effective.

"Domestic Engineering" is in this fight for better methods and **more enlightened and honest dealings, and will aid the thinking men of the trade in solving these problems aright, and to the betterment of the entire community.** **Elmer Crawford.**

Plumbing Legislation

Decatur, Ill.—This city has just adopted a new plumbing ordinance, which provides for work of modern standards, the same to be rigidly passed on by an inspector appointed by the mayor. The use of cheap goods is eliminated, nothing less than extra grade being permitted. Disagreement over the ordinance was not as marked in the council as among the master plumbers, some of whom for a time objected to extra heavy soil pipe for the house drain, contending that tile would answer in certain classes of work, and objecting also to the provision for re-venting. Both of these important provisions were retained, however. The citizen of moderate means will thereby be assured plumbing as sanitary as that installed in the homes of the wealthy. From the tax payer the only objection came from a class of moneyed men who build cheap houses for speculative purposes, equipping them with cheap plumbing. In its entirety the ordinance is believed to be one of the best ever adopted in the west, and insures the Decatur citizens high grade sanitary plumbing. Members of the city council, admitting their inability to judge intelligently the merits of the measure, invoked the aid of the H. Mueller Manufacturing Co. to pass upon its provisions, and in so doing the company upheld the master plumbers who were insisting upon high grade goods and modern methods of installation. As originally drafted by a committee of master and journeymen plumbers the ordinance contained a provision making Mueller goods the standard of quality. To this there was never any objection by the aldermen or any of the master plumbers, and it became a part of the law.

J. D. Rosenbaum, a hustling salesman for the Acme Brass Works, of Cleveland, O., and his assistant. Mr. Rosenbaum is at present making an extensive trip through the South and the West.

Trade Literature Received

From Kellogg-Mackay-Cameron Co., Chicago, catalogue of the "Modern Brooder Heater," 9"x6", 16 pages and cover. This catalogue is intended to show the construction of a heater especially adapted for chicken brooders. Naturally it goes into full detail as to the operation of the heater and points out various conclusions which have been reached by the manufacturers as to why this heater is a good one for the pur-

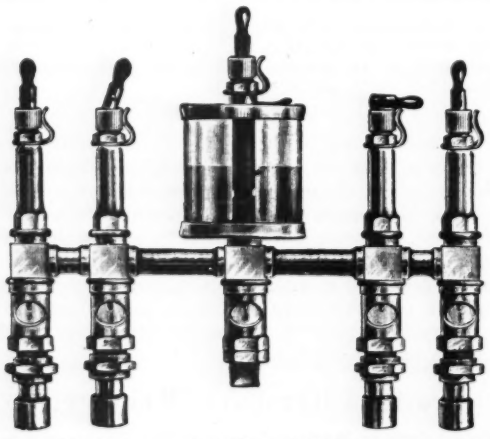
pose. A copy of the pamphlet will be sent upon application mentioning "Domestic Engineering."

From the Honeywell Heating Specialty Company, Wabash, Ind.: "Opinions of a Few of the Leading Jobbers" and "Reasons Why You Can Depend on the Honeywell System of Hot Water Heating." The former of these publications is a facsimile reproduction of some twenty endorsements of the Honeywell system of heating from leading jobbers. They speak in no uncertain tones about the excellent qualities of this system. Space allows only one quotation, which is selected at random: "One of our customers," says one jobber, "reports that he put in thirty of them last season and every one proved perfectly satisfactory. He is a man of large experience, and says that nothing has ever been introduced in the heating business that has proved as gratifying to the steamfitter or as satisfactory to the user." This is a typical endorsement, and all the other letters reproduced are as enthusiastic in their expressions concerning the system. The other publication is a little booklet which states in clear, plain and every-day language why the Honeywell system is such a reliable device. If any reader of this journal does not yet have a thorough knowledge about the Honeywell system this little booklet will bring this information, and it can be obtained on request, mentioning "Domestic Engineering."

With the Makers

Lubricating Devices for Gas and Gasoline Engines.

Eagle Brass Works, of Detroit, Mich., manufacturers of plumbing goods, are just announcing that they have added to their list of products a complete line of automatic and gravity oiling devices for service on gas and gasoline engines. This line consists of the following

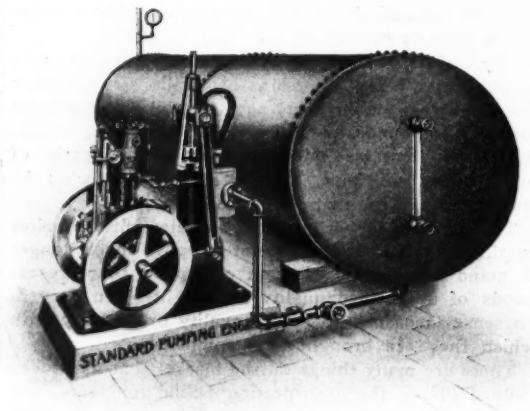


"Eagle Ohio" compound sight-feed oilers for gas engines.

devices: "Eagle Success" brass body lubricator for gas engines and air compressors, "Eagle Perfection" snap lever, sight-feed, glass oil cup, "Eagle Marvel" snap lever, glass body, sight-feed lubricator, "Eagle Modern" automatic crank pin and cross head oiler, "Eagle" brass indicator valve for gas engines, "Eagle Marine" brass body screw feed grease cup, "Eagle Superior" spring compression grease cup and "Eagle Ohio" compound sight-feed oilers for gas engines. These devices are made under the personal supervision of mechanical experts, who have had years of experience in making and designing this line, and the manufacturers guarantee that the devices will work perfectly and give absolute satisfaction. Should they be found otherwise they can be returned at the manufacturers' expense. A new catalogue illustrating and describing these lubricators has just been issued and will be sent promptly to interested parties who write for it and mention "Domestic Engineering."

The Standard Pumping Engine.

The Standard Pump and Engine Company, of Cleveland, O., manufactures an excellent line of pumping engines of different types and sizes for pumping water from deep or shallow wells, lakes or reservoirs, with capacities from 800 to 3,500 gallons per hour, and in sizes of two and four horse power. One of these



The Standard Pumping Engine Attached to a Kewanee Water Supply Tank.

Standard pumping engines operating in connection with the Kewanee water supply system is shown in the accompanying illustration, which is claimed to be an ideal arrangement for a suburban or country water supply plant.

This machine is a combination of a high grade gas or gasoline engine, mounted on the same base with a good high pressure pump and it makes a very neat and compact machine for work of this character. These pumping engines may be used in connection with any kind of water supply system, and in many instances they are being used to replace windmills and other devices which are not designed for continuous heavy service and the higher pressure required. They meet all of the exacting requirements of the fire underwriters and may be installed in residence buildings or outhouses with perfect safety.

This pumping engine has been on the market for the past ten years, though it is only recently that it has

been brought to the attention of the plumbing trade. The manufacturers advise that they have trade arrangements with many of the leading dealers and makers of water supply systems, and that the Standard Pumping Engine can be secured with any kind of a water supply plant if the purchasers desire it.

These small and self-contained pumping outfits should open up an entirely new field for enterprising plumbers as there is hardly a small town large enough to support a plumbing shop which does not have a considerable trade with suburban or country residents, to say nothing of the new business which might be secured by presenting the advantages of these small water supply plants to the present owners and prospective builders. This will not only bring the business of the installation itself, but it will be followed by an increase in trade generally.

Personal inspection of the machine shows it to be a very simple matter to install them, and they are being shipped to all parts of the country where they are giving perfectly satisfactory results. Enterprising plumbers should not be without catalogue and prices of these machines, and these will be furnished on request by the Standard Pump and Engine Company, of 7 Michigan street, Cleveland, O.

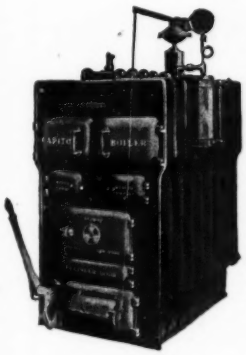
Cole's Labels for Plumbing and Heating Shops.

In his interesting letter on "How to Store Plumbing Goods," published in last week's issue of "Domestic Engineering," John Burton gives a vivid and entertaining word-picture of how he wasted half a day hunting for a trap in his shop. C. E. Cole, of Birmingham, Ala., writes that if "Uncle John" had had a set of his illustrated labels for plumbing and heating shops, this could never have happened. Mr. Cole is the manufacturer of illustrated labels for plumbing and heating supply houses and shops, gas plants and hardware

Reduced Reproduction of one of Cole's Labels.
Actual Size 4 × 2 Inches.

houses, and that these labels fill a place in the conduct of such establishments is shown by the fact that more than a million have been sold in the short time which has elapsed since they were placed on the market. His labels are about 2x4 inches, and an idea of their appearance may be formed by a glance at the accompanying illustration. They are time savers and a great help to reduce mistakes to a minimum. Although they are sold at a very moderate price, the manufacturer, C. E. Cole, P. O. Box 460, Birmingham,

CAPITOL BOILERS AND RADIATORS



This TRUTH is Worth Repeating

Why not save the expense of that piping necessary with certain types of steam boilers?

Capitol Boilers have a countersunk header, which renders unnecessary all that extra piping. This construction in **Capitol Boilers** insures a steady water line and dry steam; likewise reduces expense of installation.

Again, the countersunk header in the **Capitol Boilers** being flush with the top gives the fitter ample head room and a saving of space, a big factor when working in low basements.

And this is but **ONE** of the many exclusive superior merits of **Capitol Boilers** —and it appeals to the customer, makes selling easier.

Write for Catalog and details of our co-operative methods.

United States Heater Company.

General Offices and Works: Fort St. and Campbell Ave., DETROIT, MICH.

BRANCHES:
DETROIT, 139 Jefferson Avenue.
NEW YORK, 129 Worth Street.
CHICAGO, 34 Dearborn Street.
KANSAS CITY, MO., 120 W. Eleventh Street.
OMAHA, NEB., 916 Farnum Street

SALES AGENCIES:
ST. LOUIS, MO., L. M. Rumsey Mfg. Co.
DENVER, COLO., Kellogg & Stokes Stove Co.
MINNEAPOLIS, MINN., Plumbing & S. F. Supplies Co.
NORFOLK AND RICHMOND, VA., Virginia-Carolina Supply Co.

Ala., has decided to sell them for a short time at one-third the usual price to those who write and mention "Domestic Engineering." Full particulars about this interesting offer for the promotion of system in storing of goods will be sent promptly on request.

A Watch Fob Free.

The Kennedy Fob.

The Kennedy Valve Mfg. Co., of Elmira, N. Y., have prepared this very beautiful watch fob, gold mounted on leather. They will be very glad to send one of these fobs to any man who is in the habit of purchasing valves upon receipt of request mentioning "Domestic Engineering."

The Wall Outlet Closet.

Buildings of concrete construction have revolutionized ideas in many ways and created a positive demand for new devices along several lines. Architects and builders at once saw the absolute necessity of having a wall-discharge closet that would do away with the practice of punching holes in the floors, thus weakening the spans, and they made their specifications accordingly. At that time there was no such thing on the market as a wall-outlet closet, but at once everybody tried to adapt and rearrange old ideas to meet the new conditions.

The task was far more difficult than at first thought for one device after another proved failures, until finally the Federal Company, of Chicago, came to the rescue with its Arkin closet. This closet is claimed to be an absolute and complete success in every particular; it economizes space and water used, requires less piping, opens to the wall, thus preserving the floors intact, and has a waterway which, being without a contracted place in the long leg, cannot clog up.

Rendered suspicious by the previous failures with other closets, architects and builders have given the Arkin the most thorough tests and trials, and it is said that they finally have been forced to admit that it does all that is claimed for it, and that it is a complete success. The result is that this closet is rapidly coming into general use, and it is doing much to bring cement into more popular use as a building material, for it is an old but true saying that "the value of a building is measured by its plumbing." The Federal Company will be glad to send full particulars on request to those interested in this type of closets.

Patents

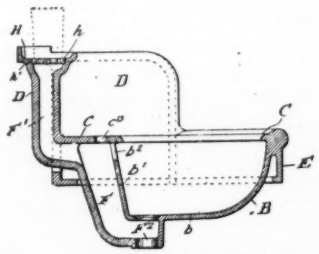
892,450. Pressure-Reducing Valve. Thomas Robinson, Low Bentham, England.

893,603. Water-Purifier. John Bowey, Jr., London, Ontario, Canada.

893,609. Damper-Regulator. William P. Dennis, Philadelphia, Pa., assignor to William Ewers, Philadelphia, Pa.

893,646. Water-Closet Seat. Louis Oppenheim, New York, N. Y.

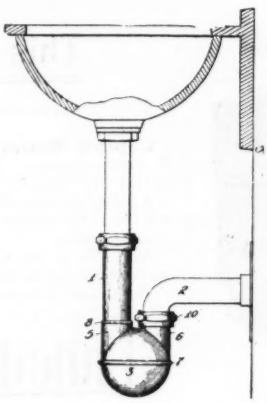
893,716. One-Piece Lavatory. John H. Gavin, Chicago, Ill., assignor to L. Wolff Manufacturing Company, Chicago, Ill., a corporation of Illinois.



893,770. Shower-Valve and Valve-Box. James A. Wilson, Chicago, Ill.

893,774. Tank-Heater. George E. Bishop, Dowagiac, Mich.

893,791. Trap for Waste-Water Pipes. Walter J. Frost, Kenosha, Wis.



893,847. Gas-Cock. David E. Hopper, Paterson, N. J.

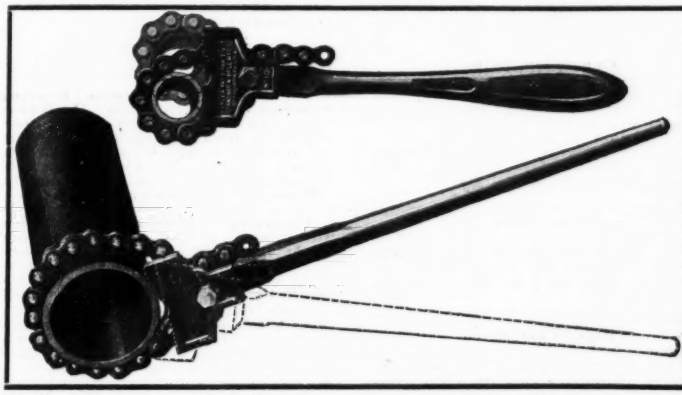
893,903. Pipe-Wrench. Jabez Cooper, Carnegie, Pa., assignor of one-third to Jabez Cooper, Jr., and one-third to George E. Pitzer, Carnegie, Pa.

893,918. Thermostat. William F. Gossick and Arthur R. Van Valkenburgh, Chicago, Ill.

FLJERCO

SANITARY EARTHEN-WARE

CAMERON, WEST VIRGINIA

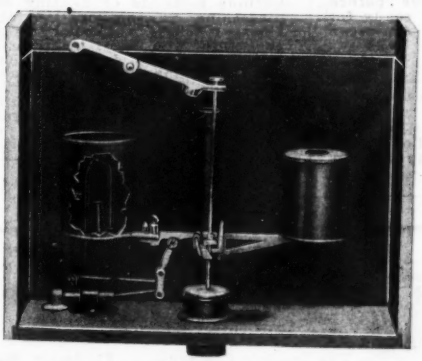


THE DUPLEX Chain Wrench

Highest efficiency in service meaning better work with quickest dispatch and less labor. The jaws, chain and handle of the **Duplex Wrench** are so constructed as to insure proper distribution of teeth on pipe at all times. The Duplex Wrench releases and reverses itself instantly without readjustment.

Standard Nipple Mfg. Co.
7440 Finance Street, PITTSBURGH, PA.

SIMPLICITY LOW-DOWN TANK



No Floats No Rubber

Supply Valve cannot make hissing or squealing noises as it is either Wide Open or CLOSED TIGHT

—the kind of letter that COUNTS

Detroit, Mich., July 8, 1908.

Climax Sanitary Company, Detroit, Mich.

Gentlemen:—For several years I used in my bathroom a low-down flush tank, which never gave satisfaction. Half the time the flush valve would not drop after flushing, and when it did drop would not seat perfectly, thereby causing a constant flow of cold water through the bowl, and consequent flooding of the floor around the bowl with condensation. In looking for a substitute I was induced to try one of your new Simplicity tanks, and am pleased to say that it gives perfect satisfaction. It is absolutely positive in its working, and does not leak a drop at the flush valve, so far as we can discover. We have **no more wet floors.** I can cheerfully recommend the Simplicity tank as the best, as well as the simplest, I have ever seen.

Yours very truly,
Frank C. Kennedy, 421 Hurlbut Ave.

The Simplicity supply valve closes almost on a dead centre. The conical lead weight in can A forms an overweight that will shut off against a water-pressure of 200 lbs. Fully Tested.

The outlet valve is closed by a washer of the finest Vici leather, guaranteed never to grow hard. It is leak-proof, and will wear for years.

We invite the fullest investigation. Write today for complete wood-work catalogue, also sample of patented lock-joint wood-work, by return mail, free. The Simplicity Tank caters especially to critical tastes, yet is sold at a moderate cost.

We have sold over 200 during the past 90 days to a single customer. It is easily worth your while to drop us a postal.

MANUFACTURED BY

CLIMAX SANITARY COMPANY
Dubois and Gunin Streets, DETROIT, MICH.

Domestic Engineering

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Copy and cuts for advertisements should be received by the last day of the week preceding publication. We cannot guarantee insertion or changes in advertisements if received later.

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Subscriptions are payable in advance, the regulations of the Post Master General forbidding the extension of credit for subscriptions.

August 1, 1908

CLASSIFIED ADVERTISEMENTS

The rate of advertising under this heading is 10 cents a line an insertion. The average advertisement runs six words to a line. To insure insertion in this column copy should be received not later than Wednesday afternoon.

Help Wanted.

WANTED—A GOOD SHEET METAL worker and plumber; steady work for good man. The Geo. Wilson H. & S. Co., Florence, Colo.

WANTED—EXPERIENCED SALESman acquainted with the plumbing trade in Pennsylvania and throughout the East to handle a full line of high-grade hot water and steam specialties in connection with affiliated lines, on commission basis. Address The Schubert Specialty Supply Co., Sellersville, Pa.

Situations Wanted.

PHILADELPHIA REGISTERED PLUMBer, dissolving partnership, is open for engagement or proposition in any city or town. Address A. F. S., 1218 Jackson st., Phila.

POSITION WANTED—HUSTLING young man, experienced in steam and hot water heating, would like to secure steady position with reliable firm in non-union town. Address 917, "Domestic Engineering," Chicago.

For Sale.

FOR SALE—OTHER BUSINESS REquires owner's attention; well established, thriving plumbing business in Seattle, Wn.; good jobbing and contract trade; A-1 reputation; investigate. Address No. 912, "Domestic Engineering, Chicago.

Miscellaneous.

WANTED—WROUGHT IRON PIPE couplings—all sizes, any quantity. Write for prices, stating what you have on hand. Phila. Pipe Coupling Co., 650 N. Park Av., Phila.

WE ARE IN THE MARKET TO PURCHASE in large quantities, brass castings, machined and assembled, some parts to be pickeled. No. 916, Domestic Engineering, Chicago.

Plumbing Schools.

EARN $5 A DAY—LEARN TO BE a plumber in from 4 to 6 months on easy payments. For particulars address Master Plumbers' Trade School, 3402 Lindell Ave., St. Louis, Mo.

BUYERS' READY REFERENCE

Brass Castings.

We are equipped to do your casting in brass, bronze or special metals. Get our prices. McCambridge & Company, Philadelphia, Pa.

Expansion Bolts.

STAR EXPANSION BOLT CO., 147 Cedar St., New York City. Expansion Bolts in Brass, Iron & Lead. 100 different styles. Any size (⅛"-2"). Star Drill Holders and Special Drills. Write for catalog—fully descriptive.

Couplings.

SELL YOUR SURPLUS COUPLINGS and fittings. We buy. Write us. A. & J. Mfg. Co., 26 W. Randolph St., Chicago.

Pipe, Cast Iron.

CHAS. MILLAR & SON CO., UTICA, N. Y. Superior quality Cast Iron Gas and Water Pipe, Cast Iron Soil Pipe and Fittings, Cast Iron Screwed Fittings.

Gas Fixtures.

E. BAGGOT CO., 45-47 EAST LAKE St., Chicago, Ill. Makers of Gas Fixtures and Fittings.

Lighting Fixtures.—Gas only, and Combination Gas and Electric. Send for Catalogue showing complete line at prices you have never before seen quoted. Large stock, ready for immediate shipment. American Brass & Glass Co,, 19 La Salle St., Chicago.

Plumbing Specialties.

PLUMBERS' SPECIALTY MFG. CO., 821 Chestnut street, St. Louis, Mo. Fuller Balls, Feather Edge Syphon Valve Washers, Compression Washers, Douglas Tank Balls and full line of Plumbers' Rubber and Brass Specialties. Galvanized Iron Pipe Hangers. Special prices.

Traps, Steam.

THE ALBANY STEAM TRAP CO., Albany, N. Y. Improved Return Steam Traps. Practicability and efficiency.

Water Closets.

K. V. A. CLOSET TANKS AND Seats. None better made. Knott-Van Arnam Mfg. Co., Fort Wayne, Ind.

THE R. C. McCLURE CO., SYRAcuse, N. Y. Mfrs. of the very highest grade of Water Closets. Send for booklet.

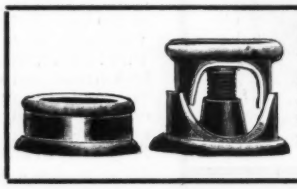
BOOKS.

Air Valves for Steam Heating Systems.—Written by W. H. Wakeman, an expert steam engineer. Shows to advantage how to use, why to use and where to use air valves. Paper bound, 7¼x5¼ inches; 20 illustrations; postpaid, 25 cents. "Domestic Engineering," Chicago.

Plumbing Catechism.—This book formulates, in question and answer form, the basic principles of plumbing design and practice. It is therefore especially commended to students in engineering and trade schools, and to master and journeyman plumbers, preparing for examinations. Bound in cloth; 6¾x4¾ inches; 100pp.; postpaid, $1.00. "Domestic Engineering," Chicago.

Practical Steam and Hot Water Heating.—By A. G. King. This work consists of a series of blue prints, showing in full detail the proper installation of steam and hot water heating plants. It is a practical book for the practical man. No steamfitter's library is complete without it. Price, $5.00, delivered. "Domestic Engineering," 49-53 N. Jefferson St., Chicago, Ill.

Swimming Pools.—Their construction, cold and hot water supply; various methods of heating water; directions as to selecting correct sizes of heaters. A complete guide, containing the latest information on the subject. By Jno. K. Allen, Associate Member of American Society of Heating and Ventilating Engineers, Editor of "Domestic Engineering." Over 30 illustrations. Bound in cloth. Price, 50 cents, postage paid. "Domestic Engineering," Chicago.



YOUR LOSS IF YOU DON'T KNOW IT

Adjustable Radiator Foot Rest

Can be used for bath tubs and other fixtures. Time saved on each job pays for them.

The Jennison Company, Fitchburg, Mass.

Sold by Jobbers

F. E. CUDELL'S TRAP

Sewer Gas and Backwater

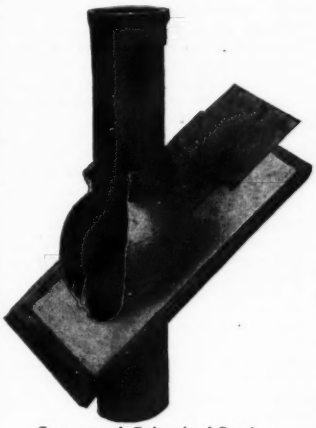
(Patented)

For Wash Bowls, Sinks, Bath and Wash Tubs

Put into the White House by the United States Government

For Venting use Vent Trap. CLEVELAND, O.

NO LEAK—NO RUST



Copper and Galvanized Steel.

The "Bullard" Adjustable

ROOF FLANGE

Everyone who has used the "BULLARD" is enthusiastic in his praises. It meets the demands from every viewpoint. Any one size flange adjusts to **all** roof pitches.

No Seams — No Solder
No Bolts—No Raw Edges

Cannot Hold Moisture
Sheds Moisture Like a Duck's Back!

Kalamazoo Roof Flange Company
490-500 Edwards Street, Kalamazoo, Mich.

THE
Kennedy Valve

is the Superior Product of

BRAIN and SKILL

from the Highest Grade Materials

SPECIAL FEATURES

All outside rising stem or yoke gate valves, and inside stationary stem gate valves for "medium" and "extra heavy" pressure can be packed while under pressure.

SEND FOR CATALOG

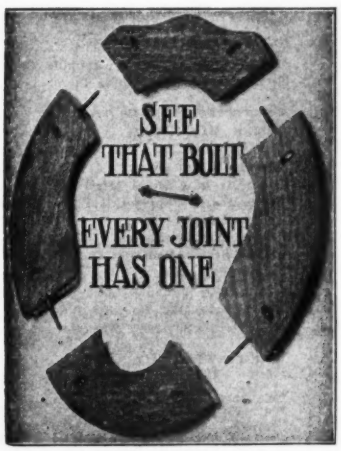
Sole Manufacturers and Sales Managers of the
PENNIE PATENT BACK WATER VALVE

THE KENNEDY VALVE MFG. CO.
MAIN OFFICE, ELMIRA, N. Y.

AGENCIES:
Chicago, Dugger-Clark Co. San Francisco, Culin & Stanyan.
New Orleans, Louis Kaufman. Louisville, E. D. Morton & Co.
And at 57 Beekman Street, New York

AN UNCONDITIONAL GUARANTEE

"Never-Split" Seats Warranted



FOR FIVE YEARS—NOT TO SPLIT OR COME APART AT JOINTS

All "Never-Split" Seats have, in addition to tongue, groove and glue of the ordinary seat, a **sturdy steel bolt in each joint,** as shown in cut. In the selection of woods we use the greatest care to get only the highest grade. Absolutely nothing is sacrificed to the mere reputation of the strength of the bolts. The rigidity and sanitary perfection of the

"Never-Split Seat"

makes it the most satisfactory seat made today, absolutely so. All styles in woods and finish are obtainable.

SEND FOR OUR CATALOGUE

THE NEVER-SPLIT SEAT COMPANY

EVANSVILLE, INDIANA

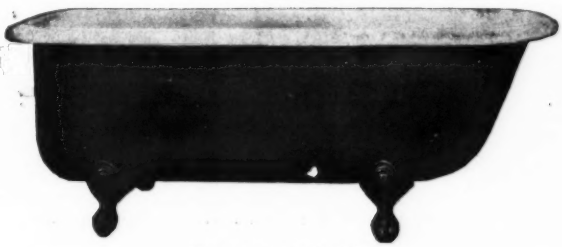
INDEX TO ADVERTISEMENTS

The star indicates that the advertisement is inserted every other week: the dagger (†) once a month.

*Adam's Steel & Wire Works.....xviii
American Air Cleaning Co.....Boston Ed., xxviii
American District Steam Co.....ix
*American Machine Co.....xliv
American Plumbers' Supply Co.....Pac. Coast Ed., xxb
*Anchor Stone Laundry Tray Company.....W. Sta. Ed., xxxviii
†Anderson McCutchen Co.....xvii
*Andrews & Johnson Co.....xviii
Armstrong Mfg. Co.....v
Atlas Brass Works.....P. C., xxviiib
Barrett Mfg. Co., James..... —
Beaton & Corbin Mfg. Co.....viii
*Beardslee Chandelier Mfg. Co.....W. Sta. Ed., xxxviiia
Beler Water Heater Co., W. Sta. Ed., xxviiia
*Bell, Andrew..... —
Bell Specialty Co.....xxc
*Berger Bros. Company.....ii
*Berger, B. A..... —
*Berkshire Mfg. Co..... —
*Bernz, Otto..... —
*Bickford Drill & Tool Co.....xlvi
*Bignall & Keeler Mfg. Co.....ii
B. L. Wrench Co.....xxx
Bogue Lead Co.....W. Sta. Ed., xxvii
Borden Co., The..... —
Boston Brass Co.....xxx
*Boynton Furnace Co..... —
Braender, Philip.....v
*Buffalo Radiator Co..... —
*Burlington Brass Works.....xviii
Cahill Iron Works.....xxxviii
*Cambridge Plumbing Supply Co..... —
Campbell Brass Works, J. B.....xxx
Canfield Co., H. O.....xiii
Capitol Brass Works....N. Y. Ed., xxviii
Case & Son Mfg. Co., W. A....Ph. Ed., xx
Central Chandelier Co..W. Sta. Ed., xxviiic
*Champion Safety Lock Co..... —
Chicago Dryer Co.....W. S. Ed., xxviiic
Chicago Engraving Co.....xxd
Clayton & Lambert Mfg. Co.....xliv
Climax Sanitary Co.....125
*Coggeshall, C. P..... —
Colebrook's Sons, W. H.....xxix
Colorado Lead Works Co..W. Sta. Ed., xxvii
Columbus Brass Co.....xliii
Commonwealth Hotel.....Boston Ed., xix
Compound Injector & Specialty Co.....x
Cornell & Underhill.....N. Y. Ed., xix
Crampton-Farley Brass Co.....W. Sta. Ed., xxviiic
Crane Co.....iii
Crary Co.....W. Sta. Ed., xxa
Crawford, L. M.....W. Sta. Ed., xxviii
Crosby Steam Gage & Valve Co.....i
†Cudell, F. E.....126
Dahlquist Mfg. Co.....xlii
*Davis-Boston Lead Co..... —
Davis Co., John, The.....iv
Davis Co., L. N..... —
Dayton Supply Co.....xl
Deming Co., The.....xliv
Detroit Lubricator Co..... —
Detroit Sanitary Supply Co.....xlii
Detroit & Buffalo Steamboat Co....xxviiic
Dixon Crucible Co., Joseph.....xvii
Eagle Brass Works.....x
†Eljer Co.....125
*Estabrook's Son, R..... —
Eureka Mould, The.....xvii
*Eureka Valve Co..... —
Federal Company.....xxxviii
Flagg & Co., Stanley G.....xlv
Fleck Bros. Co.....xxxvi
Fort Pitt Supply Co....W. Sta. Ed., xxviiif
†Foster Engineering Co..... —
*Franklin Pipe & Foundry Co.....xlv
*Frederick-Elder Co..... —
Fredonia Hotel.....Boston Ed., xix
Frost Mfg. Co.....xvi
Furlong, Thos. N.....Pac. Coast Ed., xxb
Glauber Brass Mfg. Co.....i
*Graham Chemical Potteries Co., Chas.. —
Great Western Pottery Co..... —
Greenfield Faucet Co....W. Sta. Ed., xxviiib
Gurney Heater Mfg. Co.....iii
Harvey's Sons Mfg. Co....N. Y. Ed., xxviii
*Haas Co., Philip.....xliv
†Hart Mfg. Co.....xlv
*Hayes Mfg. Co.....xlii
Hays Mfg. Co.....xlv
Herbert Boiler Co.....W. Sta. Ed., xxa
*Hessler Co., H. E..... —
Hill & Co., C. V..... —
Hoefer Mfg. Co.....vii
Holland Radiator Company.....ii
Homestead Valve Mfg. Co..... —
Honeywell Heating Specialty Co.....xv
House Service Utilities Mfg. Co.....N. Y. Ed., xxvii
Huber, Charles F.....W. Sta. Ed., xxe
Humphrey Co..... —
Humphryes Mfg. Co.....xxxvii
Hunting Co., The..... —
Ideal Heating Co.....W. S. Ed., xxe
Illinois Malleable Iron Co..... —
Imperial Brass Mfg. Co..... —
Indiana Supply Co.....W. S. Ed., xxviiid
†International Heater Co..... —
Iron City Sanitary Mfg. Co.....xxxix
†Jarecki Mfg. Co.....
†Jenkins Bros..... —
Jenkins Mfg. Co.....xlvi
Jennison Co., The.....126
*Johnson & Son Co., W. H.....xviii
Joyce Hotel.....Boston Ed., xxviii
Kalamazoo Roof Flange Co.....xxv
Kellogg-Mackay-Cameron Co.....W. St. & P. C. Eds., xix
*Kelly & Bros., Thos.....xxxvii
†Kemp Mfg. Co., C. M..... —
Kenmore Hotel.....Boston Ed.,xxviii
*Kennedy Valve Mfg. Co.....xxv
Kewanee Boiler Co.....P. C. Ed., xxa
Kewanee Water Supply Co.....i
Keystone Die Stock Co..... —
*Kilbourne & Jacobs Mfg. Co.....xlv
*Kinsey & Mahler Co..... —
Knott-Van Arnam Mfg. Co.....xli
Kohler Sons Co., J. M.....xxxvii
*Kroeschell Bros. Co..... —
Lally Co.....Pac. Coast Ed., xxb
*Lausten Lead Works.....xxix
Lawson Mfg. Co.....xvii
*Lenox Hotel..... —
Loew Mfg. Co.....xiv
Lord & Burnham Co.....v
M. & M. Co.....Pac. Coast Ed., xxb
Maddock's Sons Co., Thos..... —
Midland Supply Co.....W. Sta. Ed., xxc
†Millar & Sons Co., Chas..... —
*Miller Foundry & Specialty Co.....xliv
Milwaukee Heat Generator Co..W. S. xxviiid
Modern Iron Works.....W. Sta. Ed., xxviiif
Monarch Brass Co.....xl
*Monarch Specialty Mfg. Co..... —
Monash-Younker Co.....xvii
*Mott Iron Works, J. L..... —
Muckenhirn Closet Co., C. H..... —
Mueller Mfg. Co., H.....xxxi
Murchey Machine & Tool Co..... —
*National Radiator Co..... —
National Steam Specialty Co.....xl
National Steel Tank Co..... —
*National Tube Co.....xxi
†Naugatuck Mfg. Co..... —
*Nelson Valve Co..... —
*Never-Split Seat Co.....xxv
*New England Plumbing Supply Co..... —
New Home Sewing Machine Company..Boston Ed., xix
N. Y. Central Iron Works Co.....xiii
†New York Leather Belting Co..... —
Normandie Hotel.....Boston Ed., xxviii
Norristown Magnesia & Asbestos Co.....xii
Nye Tool & Machine Works.....vii
Ohio Brass Co., The.....vi
Parker, Chas..... —
Pasman, A. N.....xxix
*Parmelee Wrench Co.....ix
Peerless Heater & Valve Co.....xvii
Penn Engineering Co..... —
*Perkes, Chas., Estate of.....xxx
Peterson, H. L. E.....W. S. Ed., xxb
†Pittsburgh Brass Mfg. Co..... —
Pittsburgh Valve & Fittings Co.....xxii
Ponce De Leon Hotel.....Boston Ed., xxviii
*Powers Regulator Co.....iii
Pressed Steel Sanitary Mfg. Co.....xxvia
*Providence Plumbing Supply Co.....Boston Ed., —
Prox Co., Frank..... —
Prudential Heating Co....W. Sta. Ed., xxa
*Queen City Brass & Iron Works.....xlvi
Raymond Lead Co.....i
Reilly & Co., J. F...Pac. Coast Ed., xxviiib
†Robertson Mfg. Co., The James.....Phila. Ed., xxviii
*Rose, J. A..... —
Ross Valve Mfg. Co.....ii
Russell Mfg. Co., Inc., John M.....xlii
*Rutherford & Son, J.....xviii
Ryan, E. J.....viii
*Ryan & Long.....xxxix
Ryan & Co., J. J.....xxvib
Sadler, J. M.....W. S. Ed., xxviii
†Sanitary Mfg. Co.....xxxiv
Sanitary Pump Co.....vi
*Saunders' Sons, D..... —
Savard, A.....W. Sta. Ed., xxviiib
*Scully Mfg. Co., W. J., W. Sta. Ed., —
Simmons Co., John.....viii
Simplex Faucet Co.....xlvi
Simpson, Bevans & Co....W. S. Ed., xxviii
Slater & Son, G. W.....P. C. Ed., xxviiib
Smith & Egge Mfg. Co.....xlii
Smith Company, H. B.....xx
Smooth-On Mfg. Co.....viii
*Snyder & Co., L. H.....xlvi
*Sportsman's Shot Works.....xlvi
*Sproul & McGurrin.....xlii
Standard Nipple Mfg. Co.....125
Standard Plumbing Supply Co.....Phila. Ed., xxa
Standard Pump & Engine Co.....xxvib
Standard Sanitary Mfg. Co.....xxxv
*Staples Valve Co..... —
†Star Expansion Bolt Co.....
*Stebbins Mfg. Co., E.....xlvi
*Sterling Specialty Co.....xlvi
*Street & Kent Mfg. Co.....xxxix
Threading Machine Co., The.....xxii
Toledo Pipe Threading Machine Co.....vi
Trenton Brass & Machine Co.....N. Y. Ed., xix
Trenton Potteries Co.....xxxiii
Trimont Mfg. Co.....ix
Tuller Hotel.....Boston Ed., xxviii
*Turner Brass Works..... —
Union Brass & Metal Mfg. Co.....xlii
Union Mfg. & Supply Co..Phila. Ed., xxviiia
Union Radiator Co.....Phila. Ed., xix
United States Heater Co.....123
United States Radiator Co.....xxiv
Union Supply Co..... —
†Utica Pipe Foundry Co..... —
*Vanderman Mfg. Co.....Boston Ed., xxvii
*Wade Iron Sanitary Mfg. Co.....W. Sta. Ed., xxviii
Walker & Pratt Mfg. Co.....x
Walls, Owen & Stambach Co.....Phila. Ed., xxviiib
*Walworth Mfg. Co.....xxiv
Warnock Mfg. Co.....N. Y. Ed., xix
Western Asbestos & Manufacturing Co.....W. Sta. Ed., xxviiib
Western Plumbing Supply Co..... —
Wilks Mfg. Co., S.....iv
†Williamson & Co., R.....xl
Windermere Hotel.....Boston Ed., xxviii
Wipe Joint Machine Co.....xlv
*Wood Mfg. Co., John.....x
*Wolff Mfg. Co., L.....xxxii
Wolverine Brass Works....W. Sta. Ed., xxf.....Pac. Coast Ed., xxviii
Wright Mfg. Co., The.....Phila. Ed., xxa
*Yeomans Bros..... —

"Pressed Steel"

Porcelain Enameled Bath Tubs



Patented April, 1907

The porcelain enamel on "Pressed Steel" tubs will stand any legitimate test that Bath Tubs may be subjected to, and we believe the tubs to be superior in lasting qualities to any enameled tubs on the market.

WRITE FOR PARTICULARS

Pressed Steel Sanitary Mfg. Co.

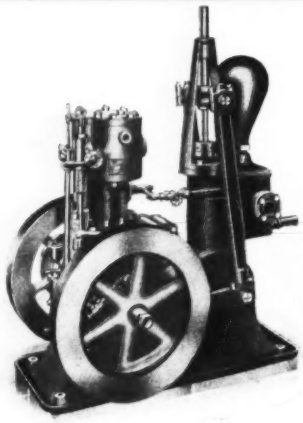
DETROIT, MICHIGAN

CLARENCE H. BOOTH, Vice-Pres. and Gen'l Mgr.

AN OPPORTUNITY FOR NEW BUSINESS

There is not a plumber's shop but what has some customers who are without a city water supply and who can be interested in

A STANDARD PUMPING ENGINE



to be used for a **SMALL WATER SUPPLY PLANT** for supplying the house and barn, watering stock and irrigating the lawn and garden.

The Standard Pumping Engine

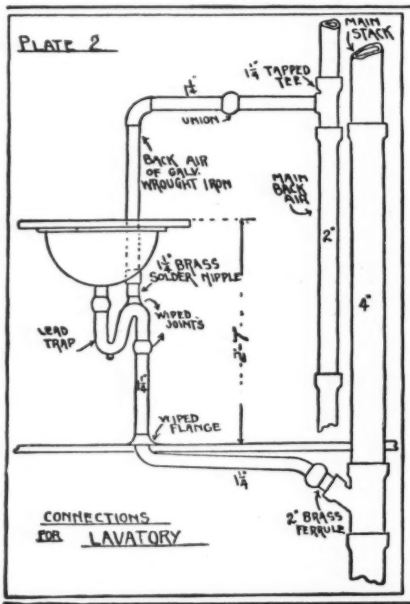
is a simple and reliable gas or gasoline engine **mounted on the same base** with a good high pressure pump (with types for both deep and shallow wells). They can be used for any kind of pumping, taking the place of windmills and other unsatisfactory devices. It costs but a few cents for operating a full day, giving abundance of water, fire protection and a power engine, all in one machine.

WE CAN SELL TO YOU DIRECT
or
YOU CAN BUY FROM YOUR JOBBER
or
you can get them with any kind of a water supply system

SEND FOR OUR CATALOGUE AND PRICES

Standard Pump & Engine Co., 7 Michigan St., Cleveland, O.

FIFTY CHARTS SHOWING HOW



PLUMBING
SHOULD BE DONE

TWENTY-FIVE CENTS

Shows every fixture, trap, ferrule, joint, pipe, vent, with proper sizes, material and distances, for every kind of a plumbing job. Great aid in estimating. Shows customers how plumbing should be done and why it costs more than making woodboxes. A new edition for 25 cents by mail prepaid. Never before this edition sold for less than $3.50. Illustration shows sample but greatly reduced. Each chart is 6½ x 4¾ in.

DOMESTIC ENGINEERING, 49 North Jefferson St., CHICAGO, ILL.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

Industrial Hygiene.

Industrial hygiene forms the subject of an article by Dr. George M. Kober in Bulletin No. 75 of the Bureau of Labor of the Department of Commerce and Labor.

It has long been known that certain trades and occupations are dangerous or injurious to health. The character of the occupation influences to a great extent not only the average expectation of life, but also the prevalence of certain diseases.

It is known, for example, that bronchitis, pneumonia, and tuberculosis are extremely frequent in dusty occupations, and that the sharp angular particles of iron and stone dust are more liable to produce injury of the respiratory passages than coal, flour, grain, and other kinds of dust. It is also known that workers in lead, mercury, arsenic, phosphorous, poisonous dyes, etc., suffer from their injurious effects, and that other occupations, such as mining, railroading, and those which necessitate working with or around moving machinery involve special danger to life and limb.

With the growth of the factory system and the extensive use in manufacture of many materials more or less injurious the subject of industrial accidents and industrial diseases is everywhere assuming more and more importance. Great differences are found in the conditions under which work of the same character is performed in different establishments. Conditions dangerous or injurious to health exist in some establishments, while they are entire avoided in others. Certain occupations which have been regarded as more or less dangerous have been shown by experience to be safe when the proper precautions are taken.

Doctor Kober in his article has endeavored to point out the relation of certain trades or occupations to the health of the workers, the sources of the dangers in various trades, and the means of minimizing or entirely avoiding them. The various classes of occupations discussed are: Indoor occupations; occupations involving exposure to irritating dust, under which are included metallic and mineral dust, vegetable dust, and animal dust; occupations involving exposure to infective matter in dust, such as rag and paper, wool and hair industries; occupations involving exposure to poisonous dust, particularly lead dust and arsenical dust; occupations involving exposure to irritating gases or vapors; occupations involving exposure to extremes of heat, sudden changes, and abnormal atmospheric pressure, constrained attitudes, over exercise of various parts of the body, exposure to machinery, etc.; coal mining and railway service; occupations involving the inhalation of organic gases and vapors; the employment of women and children.

EPITAPHS

As They Might Have Been Written.

Dear friends, here lie the bones of one
Who always carried a deadly gun.
(The other man drew first.)
Below, a man quite safely lies
Who jumped a chap just twice his size.
(Take warning.)
Kind friends, stop here and please take note,
Here lies the fool who rocked the boat.
(Companions were rescued.)
—Indianapolis News.

DON'T BE LED

to think because we carry the largest stock in the west we do not want small orders for

LEAD

Pipe, Pig and Sheet Babbit Metal, Solder

We can ship large or small orders the day received

WE DO LEAD BURNING

We pay highest prices for Old Lead, Copper or Brass
(Any Quantity)

No Trouble to Quote Prices

The Colorado Lead Works Co.
1516 Blake Street, Denver, Colorado

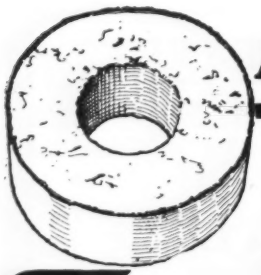
HERO
Fire Extinguisher

"A child can use it."

Put Out Your Little Fire and You Won't Have a Big One

WRITE FOR PRICES

THE BOGUE LEAD CO.
DENVER, COLORADO



ASBESTOS

Mine Covering

This sectional covering for high pressure steam is composed of a moulded case one inch thick, made of asbestos fibre, magnesia and other absolutely fire-proof material in sections 3 feet long and cased with one layer of wool felt paper, one layer of tarred felt, one layer of wool felt with a canvas jacket and brass lacquered bands, adapted and made especially for mines or damp places.

It should be kept thoroughly painted.

Asbestos Building Felt or Sheathing

This is fire-proof, and on account of its non-conducting qualities is used for lining weather boards, floors, wood partitions, R. R. cars, etc.—it is ordorless and vermin proof.

Send for catalogue and prices

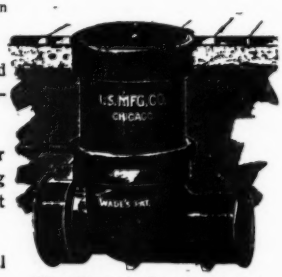
L. M. CRAWFORD

1901-9 Clay St., MANUFACTURER **Denver, Colo.**

Wade Accessible, Straightway, Flushing, Cleanout Back Water Gate Valves

Prevent the entrance of sewer gas, refuse or Flood waters from the main sewer.

Wade Figure 1. Showing action of direct pressure water



Hubbed for either vitrified clay pipe, standard or extra heavy iron pipe.

Without the back water gate valve, this fitting makes the most perfect cleanout on the market.

Write for catalogue of full line of Wade Iron Sanitary Specialties.

Wade Figure 2. Showing Figure 1, installed with extension manhole level to surface.

WADE IRON SANITARY MFG. CO.

43 East Harrison St., Chicago, Ill.

Between State and Wabash Av. Long distance Phone Harrison 6713

SADLER'S CELEBRATED PLUMBERS' DRY PASTE

The best paste in the world for Plumbers' use. Has nothing in its composition that will affect your metal or cloths in the slightest. Guaranteed not to tin no matter how often you wipe a joint over. Send 10 cents for a trial box.

JOHN M. SADLER

452 W. RANDOLPH ST., CHICAGO, ILL.

SIMPSON, BEVANS & CO.

DESIGNERS

ELECTROTYPERS

ENGRAVERS

166 So. CLINTON ST., CHICAGO

TELEPHONES MAIN 4757-4777

Lighting Fixtures

Lower Prices

Have you received our

New Discounts

on all of our catalogs taking effect Feb. 15, 1908. You can **buy Beardslee's High Grade Fixtures** as cheaply as the ordinary kind.

Get our **Catalogs** and **Prices**. Send us your orders and your troubles are over. We sell **only** to the **Trade.**

Beardslee Chandelier Mfg. Co.

(The House of Quality)

176, 178, 180 So. Clinton St., Chicago

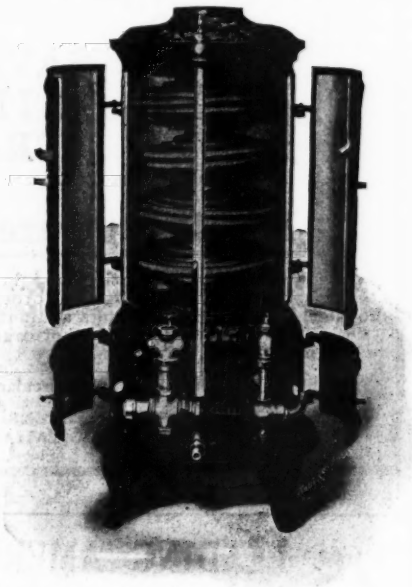
THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

The **"Beler" is Better**

The "BELER"

Automatic Thermostatic Instantaneous Water Heater

HOT WATER HEATERS



The "BELER" Automatic Thermostatic Instantaneous Water Heater

CONSTRUCTION

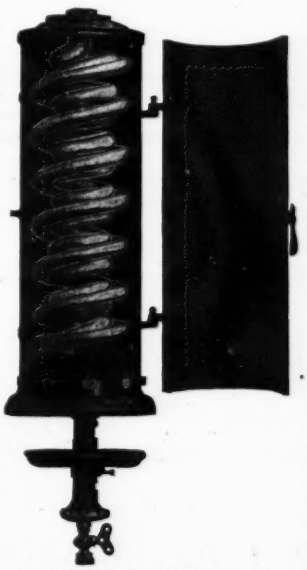
The most simply constructed heater on the market, all parts being accessible by opening the doors (no springs), which comprise the front half of the heater. (See cut.)

VALVE

Our patent Automatic-Thermostatic Pressure Regulator is an entirely new device for the Regulation of the Gas in Instantaneous Water Heaters, and is constructed without the use of springs in the water chambers, no plungers to stick, or stuffing boxes to corrode.

ABSOLUTELY SAFE AND RELIABLE

The No. 4, giving four gallons of steaming hot water, now ready for immediate delivery. Guaranteed for one year, free from all defects in material and workmanship.



The "BELER" Double Copper Coil Storage Tank Heater

BURNER

Our new Hydro-Carbon Burner, constructed without the use of gauze, and giving the highest efficiency and greatest combustion, absolutely non-corrosive.

The "BELER" Double Copper Coil Storage Tank Heater, for both manufactured and natural gas, suitable for connection with 30 to 40 gallon tank.

WRITE FOR PRICES

HOT WATER HEATERS

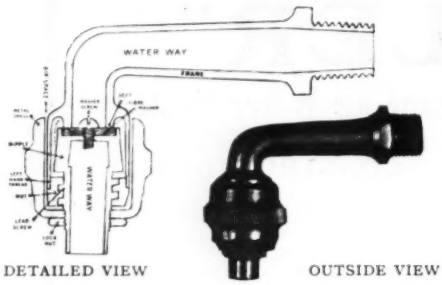
BELER WATER HEATER CO.

627 Second Avenue, PITTSBURGH, PA.

The **"Beler" is Better**

Radically New

BUT SIMPLE AND EFFICIENT



DETAILED VIEW OUTSIDE VIEW

THE NEW KILBOURN WATER FAUCET

No Valve Stem No Stuffing Box
No Leaking Parts Cannot Water Hammer
Easy Action—Simple

THE BASIN COCK

Made on same principle as Faucet. No water on slab—no spatter—steady full stream.

THE PLAIN BIBB made into Hose Bibb by simply changing nuts.

Send for Circular and Prices

GREENFIELD FAUCET CO.
54 Taylor Street, Springfield, Mass.

This Little Lady

The necessity of a modern kitchen

is just as much pleased as I was with my first top boots (red tops of course — weren't yours?) She has just tested the

SAVARD SINK TRAP

You Don't Dare!

send for our circular and ask your wife what she thinks about it, unless you want to order samples, for she will see the good points and advise you to "Order today, they will sell like hot cakes as soon as the first dealer shows them."

Why Not Be First? Send for Circular Today

A. SAVARD 2412 AMES AVENUE OMAHA, NEB.

ASBESTOS

Our New Plant

IS EQUIPPED WITH EVERY FACILITY FOR

Prompt Shipment

OF

ASBESTOS MOULDED COVERING
ASBESTOS SECTIONAL COVERING
ASBESTOS BLOCK COVERING
ASBESTOS AND RETORT CEMENT
ASBESTOS PAPER AND PACKING

IF YOU WANT Anything in Asbestos

WRITE US FOR OUR PRICES—WE CAN FILL YOUR ORDERS QUICKLY.

Western Asbestos & Mfg. Co.

West 33rd and Mariposa Sts.

DENVER, COLO.

25 LEADING AMERICAN HEATING ENGINEERS'

Answers to an apprentice's query

as to correct sizes of pipes in heating plant, are published in a book entitled

Sizes of Flow and Return Steam Mains

These replies give the practice in some of the leading shops in many different cities of the country, with tables and diagrams. A reliable reference book for the steamfitter. Size 4½ x 6½ inches; bound in red cloth; postpaid, 50 cent, in stamps or money order. Write for our Catalogue of Books on Plumbing, Steam and Hot Water Heating.

Book Department

DOMESTIC ENGINEERING
49-53 North Jefferson Street, Chicago

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

Plate No. 15. Pat. June 16, 1906. Shows "Chicago-Francis" (Gas Heated) Combined Clothes Dryer and Laundry Stove. The stove boils clothes, heats flat-irons and heats the Dryer, thus drying the clothes by what would ordinarily be WASTE HEAT. Can furnish stove for burning gas, coal or wood for fuel as may be desired.

Mr. Plumber:—

You can increase your business by selling "Chicago" CLOTHES DRYERS. The laundry room of every first class RESIDENCE, APARTMENT BUILDING, moderate sized HOTEL, HOSPITAL or other INSTITUTION ought to be equipped with a "Chicago" CLOTHES DRYER. We make CLOTHES DRYERS of all kinds and sizes, heated by GAS, COAL STOVE, STEAM or HOT WATER.

Write for illustrated catalog, D. 10 and full particulars to

CHICAGO DRYER COMPANY

379-381 Wabash Avenue, Chicago, Illinois

FIFTY CHARTS

Showing how Plumbing should be done

TWENTY-FIVE CENTS

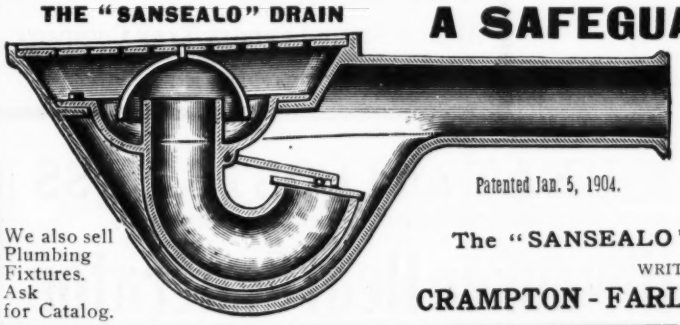
DOMESTIC ENGINEERING, CHICAGO

LIGHTING FIXTURES

CENTRAL CHANDELIER COMPANY **FURNISH FIXTURES FITTINGS**

513 Fulton St., Chicago—and Accessories

THE "SANSEALO" DRAIN



Patented Jan. 5, 1904.

We also sell Plumbing Fixtures. Ask for Catalog.

A SAFEGUARD TO HEALTH

The "Sanseal" Drain

in a building is a safeguard to health. The owner's purse is also protected against all cellar troubles for all time.

The "SANSEALO" Will Keep the Cellar Dry

WRITE FOR CIRCULAR

CRAMPTON-FARLEY BRASS CO., KANSAS CITY, MO.

BOOKS.

Fifty Plumbing Charts.—A Layout of fifty Jobs, giving sizes of all piping, Roughing-in Details for all Fixtures, etc. An awfully handy Reference—when in doubt—for the small sum of 25 cents, postpaid, delivered. "Domestic Engineering," Chicago.

Notes on Heating and Ventilation.—An invaluable Course of Suggestions for the Steamfitter who understands the Simpler Forms of Construction and Operation of Heating Systems, but who is striving to complete his Knowledge of the Business. By John R. Allen, Professor Mechanical Engineering, University of Michigan. Two hundred pages. Cloth bound. Price, $2, delivered. "Domestic Engineering," Chicago.

A Guide To Testing Plumbing.—By Jno. K. Allen, Member of the American Society of Inspectors of Plumbing and Sanitary Engineers. A complete treatise showing the necessity of testing new and old work; containing a full description of the different methods of testing drainage, plumbing and gas piping systems. 17 illustrations. Postpaid, 25 cents, delivered. "Domestic Engineering," Chicago.

THE WATER WAY

BETWEEN DETROIT AND BUFFALO

The D. & B. Line Steamers leave Detroit weekdays at 5:00 p. m., Sundays at 4:00 p. m. (central time) and from Buffalo daily at 5:30 p. m. (eastern time) reaching their destination the next morning. Direct connections with early morning trains. Lowest fares and superior service to all points east.

Popular week end excursions to Buffalo and Niagara Falls, leave Detroit every Saturday and return Monday morning.

RAIL TICKETS AVAILABLE ON STEAMERS

All classes of tickets sold reading via Michigan Central, Wabash and Grand Trunk railways between Detroit and Buffalo in either direction will be accepted for transportation on D. & B. Line Steamers. Send 2c. stamp for illustrated pamphlet and Great Lakes Map. Address: L. G. LEWIS, Gen'l Pass. Agent, Detroit, Mich.

DETROIT & BUFFALO STEAMBOAT CO.

PHILIP H. McMILLAN VICE-PRES. A. A. SCHANTZ GEN'L MGR.

DOES IT LOOK GOOD TO YOU?

WELL, IT IS AS GOOD AS IT LOOKS AND IS

POWERFUL AND QUICK ACTING

THE "HOOSIER"

Enameled Iron low down closet combination is

ENAMELED INSIDE AND OUT

The moet substantial closet combination ever built. You can sell them with a clear conscience.

They Satisfy the Customer

Write for Prices Today

INDIANA SUPPLY CO.

Capitol Ave. and Market St., **INDIANAPOLIS, IND.**

SEAMLESS, DURABLE AND SANITARY

ANCHOR STONE LAUNDRY TRAY

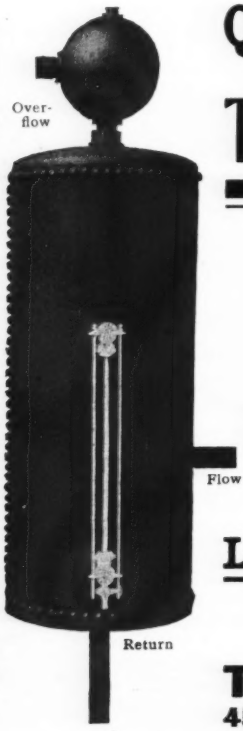
THE HANDSOMEST LAUNDRY TRAY ON THE MARKET TODAY

These Laundry Trays are scientifically and carefully constructed of the very best imported Portland Cement and Crushed Granite, fitted with Siamese Brass Plug and Couplings and as the Trays are all made in one piece and with **round corners,** there are, of course, no joints, crevices or seams in which either dirt or vermin can find lodgment. They are thus absolutely sanitary and beyond any possibility of leaking. For durability they are away ahead of comparison with any other Tray made, as they cannot be injured even when in contact with the pipes which convey the hot water and steam, and only one pipe is necessary to make connection.

Anchor Stone Laundry Tray Company

Manufacturers

MINNEAPOLIS, MINN.



QUICK HEAT and COSTS LESS

ARE ONLY TWO OF THE MERIT MARKS AWARDED TO

The Milwaukee Heat Generator

It absolutely improves the efficiency of heating systems, and when the zero weather, arrives unannounced, then it QUICKLY generates the welcome heat, which usually means much more fuel must be piled on than when slowly increasing the heat, but not so with the Milwaukee.

IT ACTUALLY SAVES DOLLARS

to every user—many dollars—while it saves the fitter much installation labor and

LABOR IS MONEYS' EQUIVALENT

Our circular tells an interesting tale which every fitter should know. SEND FOR IT TODAY.

The Milwaukee Heat Generator Co.

458 Eleventh Avenue **Milwaukee, Wisconsin**

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

WHAT SIZES OF PIPES
SHOULD BE USED
IN STEAM HEATING PLANTS?

This is an every-day question to the steam fitter. His success largely depends upon finding the correct answer

"Sizes of Flow and Return Steam Mains"

Includes the replies of 26 leading American engineers to this question together with the report of the Committee of The American Society of Heating and Ventilating Engineers upon "Standard Sizes of Steam and Return Mains."

This little book is a complete summary of present-day theory and practice as reflected by the opinions of those best competent to judge.

No Steam Fitter can afford to be without this book.

Bound in Boards—Price, postage prepaid, 50 cents

DOMESTIC ENGINEERING
49 N. JEFFERSON ST., CHICAGO, ILLINOIS

NOTES ON HEATING AND VENTILATION

By JOHN R. ALLEN, Junior Professor of Mechanical Engineering, University of Michigan

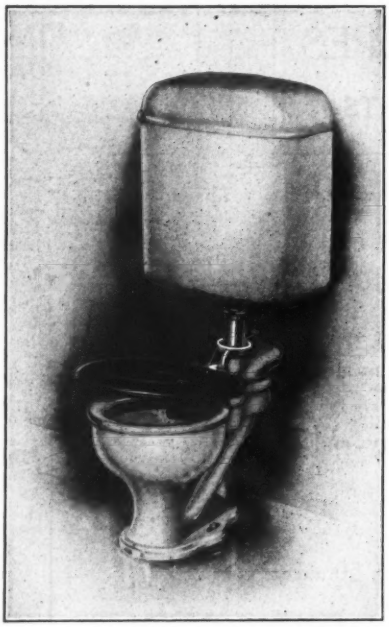
An invaluable aid to the practical steam fitter in laying out and installing heating plants.

A complete and scientific study of heating and ventilation, both in practice and theory. The subject is covered with admirable clearness and judgment, so that this work may be regarded as a full and absolutely reliable guide in solving all heating problems.

The scope of the work includes all the accepted heating systems—steam, both direct and indirect, hot water and hot air, together with general instructions regarding ventilation and piping. ¶ A thoroughly reliable book, which we strongly recommend.

Price, cloth bound, $2.00, delivered to you.

DOMESTIC ENGINEERING
49 North Jefferson Street CHICAGO, ILLINOIS



The Junior "Recio"

LOW DOWN CLOSET COMBINATION, WHICH IS HERE SHOWN, HAS LARGE RAISED LOCAL VENT — OPERATED BY SEAT. THE TANK IS

ENAMELED INSIDE AND OUT

SANITARY ENGINEERS SAY

"as a whole the *"Recio"* Closet Combinations are certainly ahead of all others for use in public places, such as office buildings, schools, libraries, clubs, etc."

THAT OPINION IS EXPERT

OUR CATALOGUE IS YOURS FOR THE ASKING

FORT PITT SUPPLY CO.

317-332 Second Avenue PITTSBURG, PENNSYLVANIA

Quin-See

Water or Gas Service Box

PATENTED

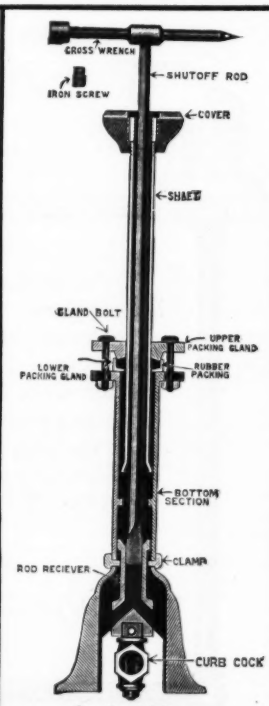
We submit the Quin-See Box to the trade as an improvement.

Our Catalogue M just issued tells all about the Quin-See Box.

Send for it and see if we can't convinces you that the Quin-See is what your city ought to have.

Modern Iron Works

Quincy, Illinois



Sectional View

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

COLEBROOK'S PIPE JOINT CEMENT

Makes Unleakable Joints

Better and Cheaper than Red Lead. Quicker and More Economical. Write for free sample and souvenir

Manufactured only by **W. H. COLEBROOK'S SONS,** **Syracuse, New York**

Lausten Lead Works

PRATT & MORGAN STS., CHICAGO

MANUFACTURERS OF

Lead pipe, Sheet lead, Lead traps and bends
Solder, Block tin pipe, Plumbers' dry soil

GOOD advertising is nothing more or less than the talk of a good, first-class salesman, not to one individual, but to each individual of a mass. One kind of salesman takes his time to carefully detail the merits of the goods he has to sell and makes his talk verbally to one customer, while the same amount of energy, thought, salesman ability and convincing argument would win perhaps a thousand people if told through the columns of the newspapers.—C. W. Post, in "Fame".

You Should Get Acquainted

with

CREST
Flush Valves

The "Crest" Flush Valve. (Patented.)

Flushing Tanks are Going Out
Flushing Valves are Coming In
Flush Valves are More Modern

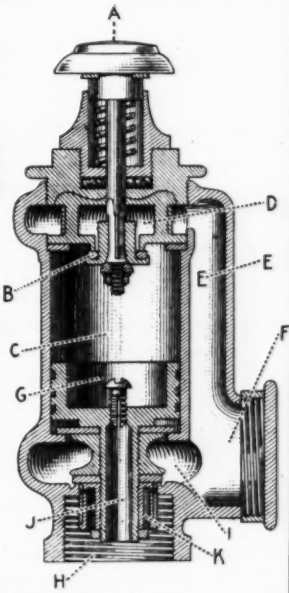
They cost no more, last longer, are more sightly, more cleanly, less noisy, occupy less room than a flushing tank. THEY FIT ANY BOWL. EASILY INSTALLED. Operating now in residences and public toilet rooms, under three to one hundred and fifty pounds pressure without trouble or attention.

Will Give Exclusive Territory to Jobbers upon Application.

Write for Circulars and Prices

A. N. PASMAN

2 Foye Place **Jersey City, N. J.**



Sectional View. (Patented.)

Simple — Efficient

"B. B."
High Pressure Ball Cock

All sizes, ½ to 3 inches inclusive, for top, bottom or end supply and also for low down tanks with special float. Removable seat of best steam metal. "B. B." Floats are guaranteed. Ask jobber for them.

Boston Brass Co.

36-40 Oliver St. Boston, Mass.

THE PERKES FORCE PUMP

$5.50 net

Order one for trial

Charles Perkes
ESTATE

Manufacturers and Dealers in
Plumbing Supplies

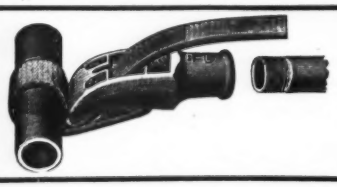
627-629 Arch St.
PHILADELPHIA, PA.

Established 1856

Enlarged Edition **$2.00**

Allen's "Notes on Heating and Ventilation". There is no better authority on construction and design than this book. Address Book Dept.

Domestic Engineering, 49-53 N. Jefferson St., Chicago



END ALL YOUR WRENCH TROUBLES!

THE B. L. WRENCH FOR POLISHED WORK

is strongest, simplest, handiest, cheapest and has several good points no other has. Get circulars

B-L WRENCH COMPANY, Sole Manufacturers, Boston, Mass.

Sanitation in the Modern Home Just off the press. Good reading and remarkably resourceful for the busy man who reads mostly for profit. Bound in cloth. Price, postpaid $2.00.

DOMESTIC ENGINEERING, 49-53 North Jefferson Street, Chicago

End Ferrules. Any Size. Best Quality.

Plumbers' High Grade Supplies

When in the market for

FERRULES

(End Reducing or Trap)

Stop and Waste Cocks Compression Work, Gas Goods, Etc.

'TWILL BE WORTH WHILE TO WRITE US

Trap Screw Ferrules. Brass and and Iron Body.

ERIE, PA. **J. B. CAMPBELL BRASS WORKS.** ERIE, PA.

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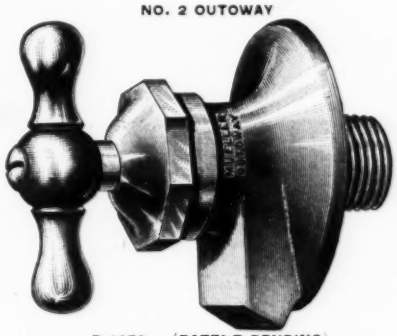
Mueller Outoway

A Diminutive Wash Tray Bibb

NO. 2 OUTOWAY



D-9072 (PATENT PENDING)

It projects from the back of the wash tray only 2½ inches, giving unobstructed working space.

It is next to no bibb at all in space occupied but equal to any Mueller Compression bibb for reliable service, having good length body threads which engage all of the stem threads at final compression, and a smooth water way that gives a free flowing stream.

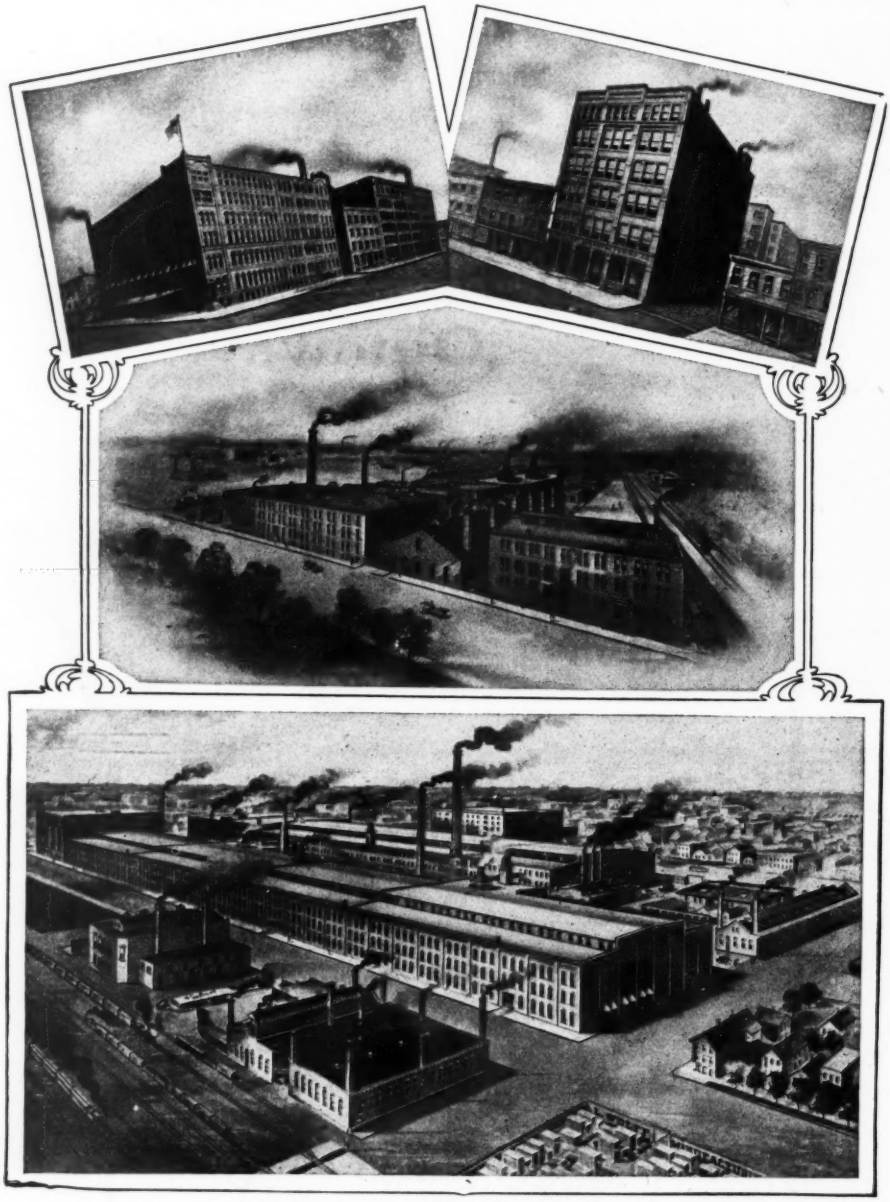
Unconditionally Guaranteed.

TRADE MARK
MUELLER
REGISTERED

H. MUELLER MFG. CO.

Works and General Offices
DECATUR, ILL., U. S. A.
West Cerro Gordo St.

Eastern Division
NEW YORK, N. Y., U. S. A.
254 Canal St., Cor. Lafayette



PLANTS OF FHE L. WOLF MANUFACTURING CO.
Located at Chicago, Ill., and Trenton, N. J., occupying about 34 acres of floor space.

If you wish the most complete Plumbing Catalogue ever issued, send us a copy of your letterhead at once.

—H—

The new 1908 Catalogue of L. Wolff Manufacturing Co., should be in every office.

ESTABLISHED 1855

L. WOLFF MANUFACTURING CO.

MANUFACTURERS OF PLUMBING GOODS EXCLUSIVELY

THE ONLY COMPLETE LINE MADE BY ANY ONE FIRM.

SHOW ROOMS, 91 DEARBORN STREET

DENVER, COLO. CHICAGO TRENTON, N. J.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

VITREOUS CHINA
Pedestal Drinking Fountain

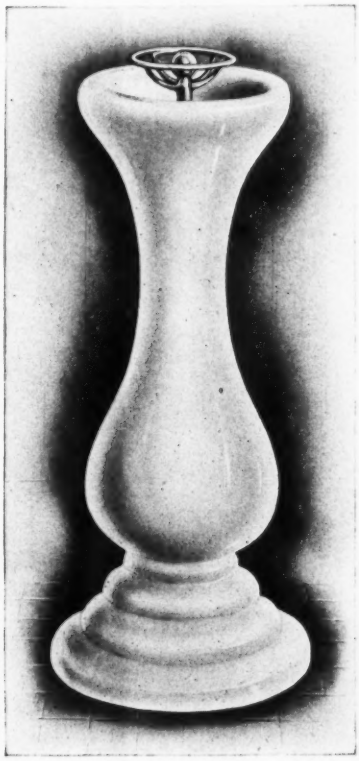


PLATE. 912-K

Pedestal Drinking Fountain of Solid White Vitreous China Ware, fitted with Nickel-Plated Brass Self-Closing Fountain Spout, with Brass Supply Pipe and Outlet Fittings through center of Pedestal into the floor, less Trap.

Dimensions:—Height, floor to top, over all, including fittings, 29½ inches; outside diameter of bowl, 10 inches; inside diameter of bowl, 7½ inches; depth of bowl, 2½ inches; diameter of base, 12 inches.

List, complete Fountain, as above described.....$36 00

NOTE.—The Pedestal Drinking Fountain can also be made for supply pipe and nickel-plated brass trap to the wall.

Code.....VERUSIDI

List, Vitreous China Pedestal Fountain only.....$20 00

List, Nickel-Plated Brass Self-Closing Fountain Spout, as shown, complete with Brass Supply Pipe and Outlet Fittings to the floor, less Trap..... 16 00

Alternative:—List, Nickel-Plated Brass Self- Closing Fountain Spout, as shown, complete with Supply Pipe and Outlet Trap to the wall..... 21 00

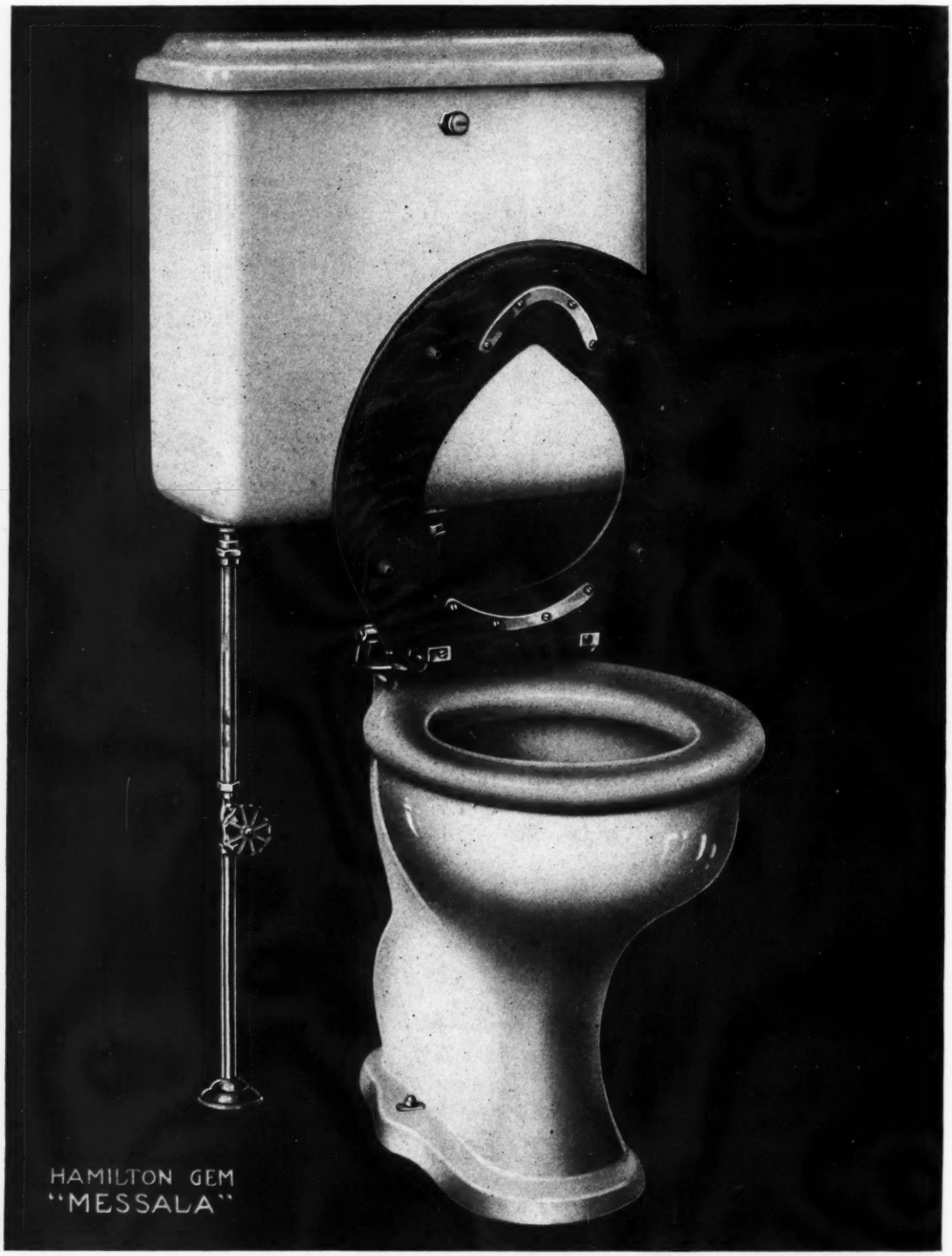
The Trenton Potteries Company

TRENTON, NEW JERSEY
U. S. A.

The Canadian Trenton Potteries Co. Ltd.
St. Johns, P. Q.

THE SANITARY MFG. CO. HAMILTON, OHIO, U. S. A.

THE MASTER BUILDERS OF QUALITY CLOSETS.



High Grade Wood Tanks
Iron Enameled Tanks
Vitreous China Tanks

THE HAMILTON GEM "MESSALA" Plate 804
IRON ENAMELED TANK.
The "MESSALA" has a self-raising seat, a closet and urinal combined.

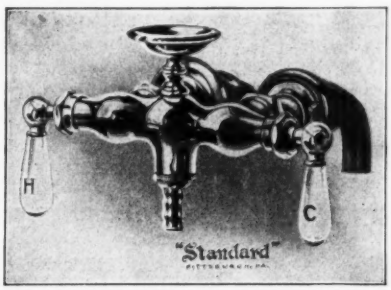
"Reliable" Ball Cocks
Close Roughing Seats
Self-Raising Seats

Plumbing Satisfaction

The plumber who uses genuine "Standard" Brass Goods on all bath room fixtures gives his customer a Bath Room that has greatest lasting qualities. There is beauty and service in all "Standard" goods, which makes your customer feel satisfied that he has received good value for his money.

"Standard" Brass Goods

are made of the very best materials obtainable and each piece is stamped "Standard" so it can readily be identified from inferior goods. A complete line of high grade brass goods for plumbers can be secured from any jobber at no higher prices than non-guaranteed brands.



Look for the stamp "Standard" on every piece, its presence insures satisfactory service.

Standard Sanitary Mfg. Co.

PITTSBURGH, PA.

A Combination That Can't be Beaten

PRICE AND QUALITY

Silo Jet Combination

No. 5. Golden or goldenized oak tank, heavy lining, ball valve, high pressure ball cock, post hinge seat and lid or with Never-Split seat and lid.

Sectional View of SILO JET Closet showing its method of operation

The Silo Jet Closet is the latest development of a Pneumatic Syphon, its action is quick, silent and powerful, has a 3-inch water seal with good water surface, a large and unobstructed water way, making it impossible to stop or clog it up. It has the same contour as a Syphon Jet bowl with pleasant and graceful lines, and as a strong, willing worker it has no equal.

SPECIAL OFFER

To acquaint you with the merits of our SILO JET outfit we will send you a sample outfit at the dozen price. Don't lose this opportunity to take hold of a good thing.

FLECK BROS. CO.

PHILADELPHIA, PA.

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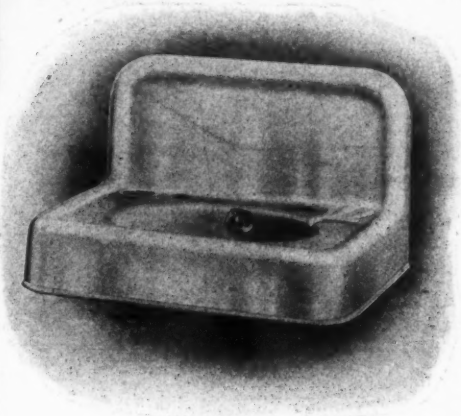
THE STANDARD OF THE WORLD

The Ware of Quality

GUARANTEED



FIRST QUALITY

TOLTEC—Plate M505
Slab, 18x24 ins.; Back, 10 ins.; Apron, 5 ins.; Bowl, 12x15 in.

Humphryes Porcelain Enameled Ware

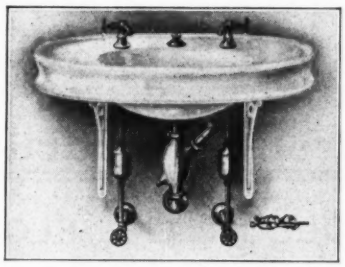
is the ware of quality. It pleases the most exacting trade because of its graceful designs, mirror-like finish, and durability. Made from the smoothest castings and faultless enamel with the highest finish.

WRITE FOR DESCRIPTIVE MATTER

The Humphryes Mfg. Co., Mansfield, Ohio

N. Y. Office and Warehouse: 636-638 W. 34th St.

POPULAR and ARTISTIC DESIGNS



The "HALLET"

Kohler Supreme Porcelain Enameled Iron "One-Piece" "Hallet" Lavatory on Enameled Wall Brackets with N. P. Brass Secret Waste with China Index.

DIMENSIONS

Elipse Slab 24x34 in. American Basin 14x18 in.

Plate A-201. All Over Enameled, - - - $31.00
Plate A-202. Upper Surface only Enameled, 28.00

Manufactured by

J. M. KOHLER SONS CO.
SHEBOYGAN, WIS., U. S. A.

NEW YORK: 48 Cliff Street. CHICAGO: 514 First National Bank Bldg. OAKLAND: 1127 5th Ave.

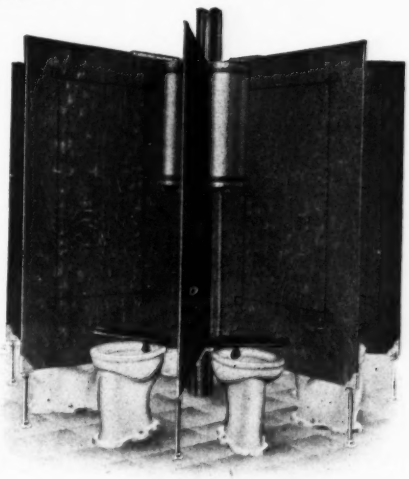
THE KELLY
OCTOPUS FITTING

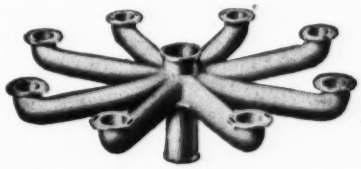
PATENT APPLIED FOR

8 Water Closets in a space equal to 7 feet and 6 inches in diameter. Octopus Fitting cast in one piece. No Joints to leak, no long runs of pipe to clog up, no back trap vents required.

Set in center of room, gives walls for windows and setting of other plumbing fixtures.

Over 50% saved in Material, Labor and space occupied.





What 2 Octopus Fittings for 16 Closets Will Save You

120 feet of Cut Soil Pipe. 24 DYs, Lead Bends, Ferrules, etc. 65 Lead Caulked Joints. All the Back Trap Venting Pipes, Fittings, Etc. 50 Wiped Joints. All the Labor to install the above.

If this interests you send for more particulars.

Thos. Kelly & Bros.
Congress St. & Belt Line, Chicago, Ill.

Nothing Top o' The Earth

Equals our line of lavatories, roll rim sinks and bath tubs and we have named them

"Southern Beauties"

and they're a combination of art and sanitary sense.

WE are the originators of One-Piece Lavatory Fixtures. The sanitary idea is "Never make a fixture in two pieces when it can be made in one." We have other new ideas. Better keep in touch with us. Something new often.
Our entire line of "Southern Beauty" enameled ware is shown in Catalogue "D". Ask for it now.

THE CAHILL IRON WORKS

CHATTANOOGA, TENN.

New York Office and Salesrooms:
Removed to 76 W. Thirty-sixth Street
Thomas H. Hutchinson, Mgr.

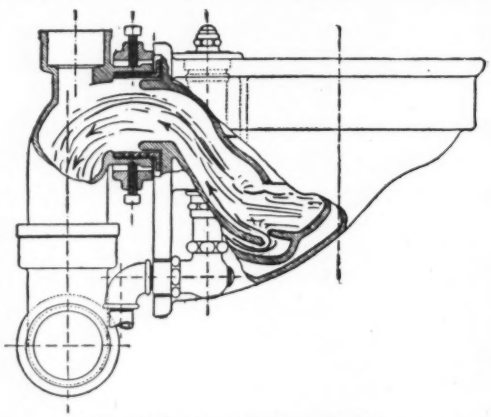
Portland Office and Warehouse:
650 Sherlock Building
H. A. Heppner & Co., Sales Agents

San Francisco Office:
1749 Sacramento St.
Culin & Stanyan, Sales Agents

A WALL OUTLET CLOSET

SPECIALLY ADAPTED FOR BUILDINGS OF

Reinforced Concrete or Steel Construction



THE "ARKIN" IN OPERATION

NO HOLE IN THE FLOOR
TO WEAR SPAN

Sits close to the wall, requires less piping, has full waterway and cannot clog or stop up.

Prompt, powerful action makes little water necessary for perfect flush.

Just the thing for **Hotels, Hospitals, Office Buildings, Factories, Prisons** snd all buildings where cleanliness, efficiency and economy are given proper consideration.

Our "H" Catalogue shows complete line of High Grade Plumbing Supplies and Brass Goods. Let us send you one.

FEDERAL COMPANY Halsted and Fulton Streets, CHICAGO.

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"IRON CITY"

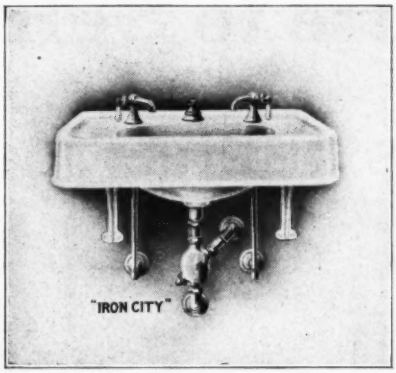


PLATE D 104

NEVER DISAPPOINTS

Not only is "Iron City" Cast Iron Enameled Ware conspicuously beautiful, but it is the most substantial ware made. We have the right men, the right equipment and the capacity which goes to make good goods and satisfaction all round. All jobbers handle our line and should be able to supply your immediate demands. Send for our new catalog D—showing new and best designs.

IRON CITY SANITARY MFG. CO.
General Offices: Pittsburg, Pa. Works: Zelienople, Pa.

BE A LEADER

"THE EARLY BIRD", YOU KNOW

The Perfection Buggy Washer

SUCCESS

in business lies in grasping opportunities as they present themselves.

Opportunity

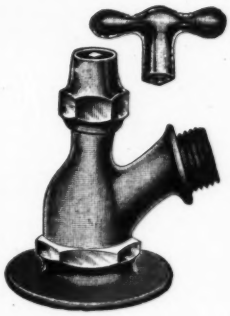
is now knocking at your door. Write us for our trial proposition. Do it Today, 'twill cost you but a cent.

RYAN & LONG

Manufacturers

576 Oneida St., Appleton, Wis.

Boston Pattern Compression Sill Cocks



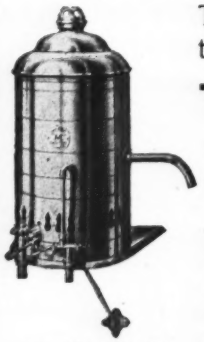
We can make immediate shipment of both patterns, in Rough Brass Bodies with Polished and Nickel Plated Trimmings, Polished Brass All Over, and Finished and Nickel Plated all over.

LET US QUOTE YOU ON YOUR IMMEDIATE REQUIREMENTS

Street & Kent Manufacturing Company

43-45 FULTON ST., CHICAGO, ILL., U. S. A.

"It Is a Pleasure to Sell"



THE "OHIO M"

The "Ohio M" Water Heater is so satisfactory to its users that the dealers take pleasure in selling it.

THE PROFIT'S THERE, TOO!

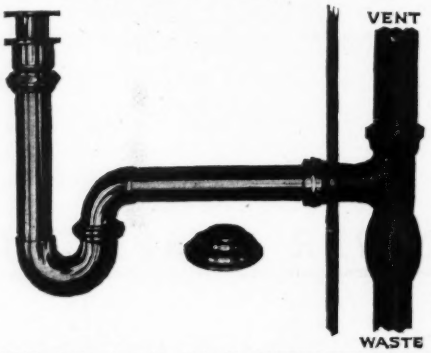
The good margin of profit is a vital factor and dealers find it is a very strong money maker.

WE WANT YOU

to handle our water heaters. Just write us for our proposition to any responsible dealer.

THE "OHIO M" WATER HEATER

DOES NOT NEED A VENT PIPE
REQUIRES NO CONDENSATION PIPE
HEATS A LOT OF WATER QUICKLY
NO SOOT IN THE WATER
IT IS A HANDSOME FIXTURE



This illustration shows in position the DAYTON VENT FITTING and BRASS "P" TRAP. The improvement, economy and sanitary features are easily apparent as compared with the old style way of fitting up.

SEND FOR CATALOGUE

DAYTON SUPPLY CO., Address Dept. D., **Dayton, Ohio.**

CO-OPERATION

Our co-operative plan is a protection to you. We advertise for you, and already have inaugurated a campaign to refer the architect to you for his best fixtures, and assure him he can get everything he may need in the way of gas, electric or combination fixtures from our catalogue through his local dealer.

There is a good profit for you if you write us for our full plan. BETTER DO IT TODAY.

R. Williamson & Co.,
88-92 W. Washington St.,
CHICAGO.

The "Monarch" Ball Cock

Guaranteed to work noiselessly and perfectly on any pressure from 1 pound to 250 pounds.

Descriptive Pamphlet sent on Request.

Sole Manufacturers

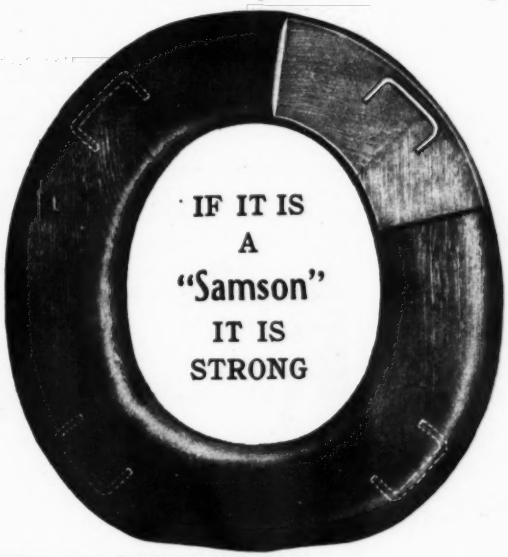
THE MONARCH BRASS CO.
CLEVELAND

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

"Samson" Strength

The "SAMSON" Water Closet Seat

is constructed right from a mechanical stand point. The four pieces of seasoned wood are rigidly held together to stay so, by four steel clamps and when you get a **"Samson" Seat** you may rest assured that the joints cannot split or pull apart. In fact the more you learn about the **"Samson"** the more logical and practical its superior points seem to you.



Will you let us mail you our circulars so you will be fully posted?

TEAR OFF COUPON AND MAIL

Knott-Van Arnam Mfg. Co.

FORT WAYNE, INDIANA

Gentlemen:—Kindly mail me your "SAMSON" Circulars and oblige

Name _____

Street No. _____ City _____

State _____

Strength "Samson"

Excelsior Grease Trap

Well and favorably known; two sizes for hotels and restaurants and residences. Get list price and trade discounts.

SPROUL & McGURRIN
GRAND RAPIDS, MICH., U. S. A.

Boston Copper Range Boilers

Tank and Direct Pressure

QUALITY and PRICE are both RIGHT

We guarantee every boiler we make and being the largest makers in New England we can fill orders promptly for every size.

Write for price list circular

Dahlquist Mfg. Co.
South Boston, Mass 3st. 1899

Plumbers' Sundries

Superior Brass Ferrules
Water Closet Pulls
Sash Chains—Split Links
Eight Hooks

Prices Quoted on Request

Send for new catalogue of Plumbers' Specialties

Extra Heavy Brass Ferrule

JOHN M. RUSSELL MFG. CO., Inc.
NAUGATUCK, CONN.

CLEAN SWEEP TRAPS

MADE IN BRASS OR LEAD

Are the Most Sanitary

The United States Government use them in public buildings. Cheerfully indorsed by Public Health Boards.

At all jobbers

DETROIT SANITARY SUPPLY CO.
Sole Manufacturers
Second and Antoinette Streets, Detroit, Mich.

Canfield

Repeat Orders

are coming in every day, said one jobber

THEY ALL SAY THE SAME

They know that Black Diamond means the best "Top o' the Earth" in

PLUMBERS' SPECIALTIES

BE WISE NEXT TIME YOU ORDER

The H. O. Canfield Co., Bridgeport, Conn.

PLUMBERS'

Chains, Eight Hooks, Split Links, Jack Chain, Tank Pulls, Pipe Straps

Write for Catalog

THE SMITH & EGGE MFG. CO.
Bridgeport, Conn.

UNION ST. PAUL, MINN.

"In Union There's Strength"

There's strength **plus quality** in all goods which are made under **"The Quality Sign"**—and they cost no more than ordinary goods. Send for our catalog of

Plumbers' Brass Goods and Specialties.

UNION BRASS & METAL MFG. CO.
ST. PAUL, MINN.

THE WILHELMI | THE MODERN

TWO BEST BOILERS

The "Wilhelmi" is a high-grade copper range boiler tested to 250 pounds and guaranteed to stand a working pressure of 150 pounds. There can be no better boiler made. The "Modern" is for use where the pressure does not exceed 100 pounds, as that is the guaranteed working pressure. It is tested to 200 pounds.

BOTH BOILERS GUARANTEED NOT TO LEAK AND AGAINST COLLAPSE

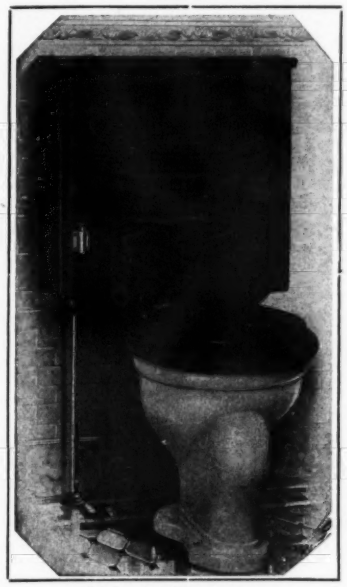
Very attractive Discounts Furnished

For Sale only by Jobbers of Plumbers' Supplies

HAYES MFG. CO., Paterson, N. J.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

Patented



"Columbus" Fig. C-300

COTTAGES

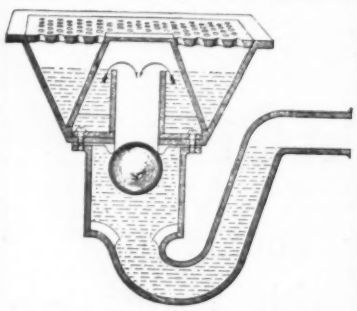
especially should be equipped with water closets that are not injured by standing empty and unused for long periods. The only closet that fills this bill is the

"Columbus"
ALL METAL CLOSET

because there is "not a stick of wood in it". It can stand all winter subject to the severest cold without injury. Wood tanks will split and come apart, ours will not. They're "All Metal".

WRITE FOR CATALOGUE

The Columbus Brass Co.
COLUMBUS, OHIO



JUST LISTEN!

We have been telling you one side of the story about these Traps, and now we want you to know what a few of our customers say about them. A man in Van Wert, O., writes: "Your Trap is O. K. I have been using the _____ Trap, but think yours best, also much lower in cost." Another from Syracuse says: "It fills the bill in every way. It is easy to clean, the best seal I have seen, and a good spill way." One from Charlotte, N. C., says: "I find that they are the very best Cellar Drains for back water I have ever seen and I have been a journeyman plumber for 27 years."

May we send YOU a catalogue?

MILLER FOUNDRY AND SPECIALTY CO.
NORTH TONAWANDA, N. Y.

"YESTERDAY IS TIMES' REFUSE"
THE "HAAS"

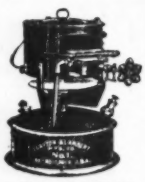
Is a product of TO-DAY, it's right up-to-date as an

Absolutely Frost Proof Closet.

It is built to defy and conquer zero weather's attacks and the enemy has not won one skirmish, not one! Write us for circulars giving full details.

PHILIP HAAS CO., Manufacturers, Dayton, Ohio.

The Business End



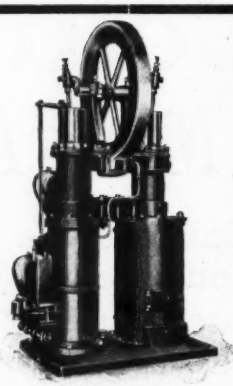
No. 1 Fire Pot $6 Net

Jobbers supply at factory price, or we will ship direct if cash accompanies the order.

The business end of a No. 1 Clayton & Lambert Fire Pot is the burner. Every other part contributes to its efficiency in the simplest, most direct and economical way yet attained. That is why, with half the gasoline other makes require, a No. 1 Fire Pot burner generates a bluer, hotter and better flame. The world's best and most skilled artisans use this fire pot. The No. 1 does everything that a perfect fire pot should do, aside from being utilized by practical workers in innumerable ways out of the ordinary. The complete satisfaction of the user has made the No. 1 the standard by which other makes are gauged.

FULL PARTICULARS IN FREE BOOKLET

CLAYTON & LAMBERT MFG CO.
DETROIT, MICH., U.S.A.



DENNEY RIDER ENGINE

DENNEY IMPROVED
Rider & Ericsson
HOT AIR PUMPING ENGINES

The most Reliable and Economical Engines for pumping water. Use any kind of fuel. Can be operated by any one. Perfectly safe, noiseless and always ready for service. Important improvements patented and not found in any other make of engines. Send for catalogue and testimonial list.

Built for years by

American Machine Co.
Newark, Delaware

ELECTRIC HOUSE PUMPS

Fig. 47

Electric Triplex Pump, designed for use in Apartment Houses, Office Buildings, Suburban Homes, etc.

By the use of street railway current, our direct connected pump will furnish a constant supply of water at small cost. Ask for Catalogue "G" and Quotations on Figure 47.

THE DEMING CO.
SALEM, OHIO

General Agents:
Henion & Hubbell, Chicago, Ill.
Ralph B. Carter Co., 50 Church St., New York
Harris Pump & Supply Co., Pittsburg, Pa.

Hot Water Heating Contracts and Specifications

We have for sale a standard specification and contract for hot water heating. It is elastic and suitable for large and small contracts. Printed on good linen paper. Price list, delivered to you:

50 copies	$ 2.50
100 copies	3.50
500 copies	10.00

Terms: Chicago or New York draft with order. Sample sent free on request.

DOMESTIC ENGINEERING
49-53 N. Jefferson St., Chicago

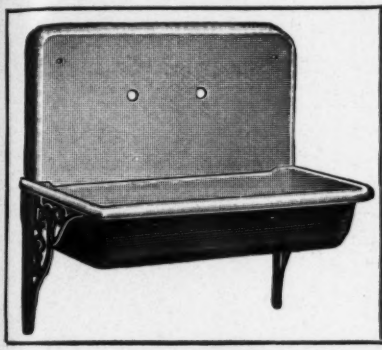
THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.

SOIL PIPE

And Soil Pipe Fittings

FRANKLIN PIPE & FOUNDRY CO.

1155 S. PAULINA STREET, - - CHICAGO, ILL.



THE CAST SINK MUST GO

Wrought Steel Sinks

Sink Backs and Sink Brackets

Indestructible! Odorless! Light, Strong and Most Durable

We make two styles known as the "Columbus" and the "New Era". Both styles made in two patterns, Flat Edge and Roll Rim. Made for wrought iron or lead pipe. Send for catalogue and trade discount.

THE KILBOURNE & JACOBS M'F'G CO.
COLUMBUS, OHIO, U. S. A.

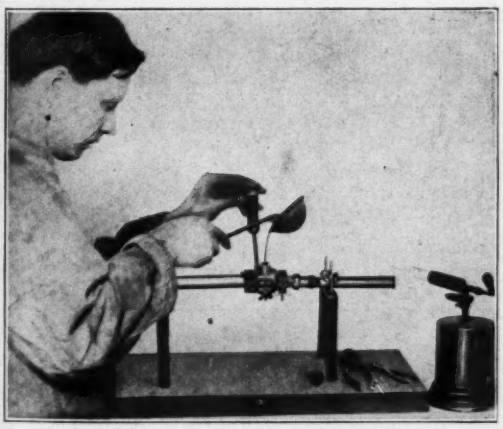
FF

"Flagg" Malleable Fittings
"Flagg" Keystone Unions

STANLEY G. FLAGG & CO., PHILADELPHIA, PA.

FF

Try it Ten Days Free!



Wipes all kinds of Lead Joints

This wonderful little machine does that and does it better, can do three men's work and the joints are stronger than handmade joints. Ask about free trial offer. Machines sent on ten days' trial to responsible parties.

THE WIPE JOINT MACHINE CO.
Sole Manufacturers
531 Schofield Building Cleveland, O.

"The Goods That Please"
Established 1869

FOR THIRTY-NINE YEARS

HAYS

Brass and Iron Fittings for Plumbing, Gas, Water and Steam.

HAVE BEEN THE LEADING LINE

Thoroughly Reputable Write for Prices

HAYS MFG. CO., 12th & Liberty Sts., Erie, Pa.

Sizes of Flow and Return Steam Mains

It gives the current practice, by 30 heating engineers. Postpaid, 50 cents. DOMESTIC ENGINEERING, CHICAGO, ILLINOIS

JENKINS MFG. CO.

SALES OFFICE

120 VESEY ST., NEW YORK CITY

Are manufacturers of high grade brass goods, at correct prices; bath tubs, lavatory trimmings, self-closing basin cocks and bibbs; push button basin cocks and valves; shower outfits complete, showers, mixing columns and anti-scalding mixing valves; malleable beaded pattern brass fittings, ground joint brass unions, all made in yellow and red metals, bronze and white metals.

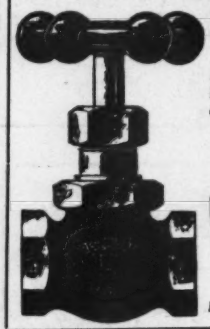
Can also furnish a large number of specialties.

Write for catalogue "F" soon to be issued.

Name .....

Town.....

State. .....



QUALITY HIGHEST GRADE.

ANY KIND OR QUANTITY **VALVES**

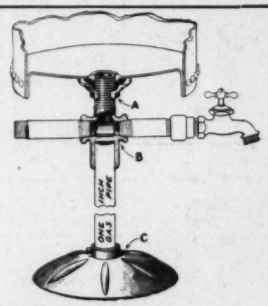
PRICES NOT AT ALL EXORBITANT

Send for Our Catalog

Queen City Brass & Iron Works

CINCINNATI, OHIO

Pacific Coast Representative:
A. J. BUCKLEY
Monadnock Building. San Francisco, Cal.



"Understand"

The Hopper Adjustable Boiler Stand and Coupling is greatly IMPROVED.

BASE is now made of galvanized pressed steel nine inches in diameter. Stand is adjustable to any heigth desired. Saves time in attaching and placing boiler in position. No bolts or nuts required. Made entirely of galvanized malleable iron and pressed steel. Send us name of your jobber if he does not carry them in stock.

STERLING SPECIALTY CO., Curry Bldg., Pittsburgh, Pa.

MOST CLEANLY & DURABLE

No grit can possibly collect in our faucet to grind out the valve or seat, in fact all faucet troubles are solved by the

SIMPLEX FAUCET

It is the only faucet made that works on the principle of closing by water pressure. Most all Jobbers have them. If yours has not, let us know and we will let you know where you can get them.

SEND FOR CIRCULARS

SIMPLEX FAUCET CO., HYDE PARK. MASS.

Just Fits the Pot!

What you have always been looking for

No more Cutting or Sawing the Pig

Sportsman's Shot Works

CINCINNATI

Snyder's Improved Model Adjustable Ceiling and Floor Plates

Bottom View

Nicely finished on copper and always made perfectly. Once used always used, because they have no equal. They stay up best. All jobbers handle them. Discounts furnished on request.

L. H. SNYDER & CO., Bristol, Conn.

RADIATOR AND HEATER DRILLS. The Bickford Drill & Tool Company, Cincinnati, Ohio, U. S. A.

STEEL AND IRON CASTINGS MADE TO ORDER. STERLING MFG. CO., Pittsburgh, Pa.

Sanitation in the Modern Home

Good reading and remarkably resourceful for the busy man who reads mostly for profit. Price, postpaid, $2. DOMESTIC ENGINEERING, CHICAGO, ILL.

OHIO STATE UNIVERSITY

E. STEBBINS MANUFACTURING CO., SPRINGFIELD, MASS.—All of Our Brass Goods Thoroughly Tested